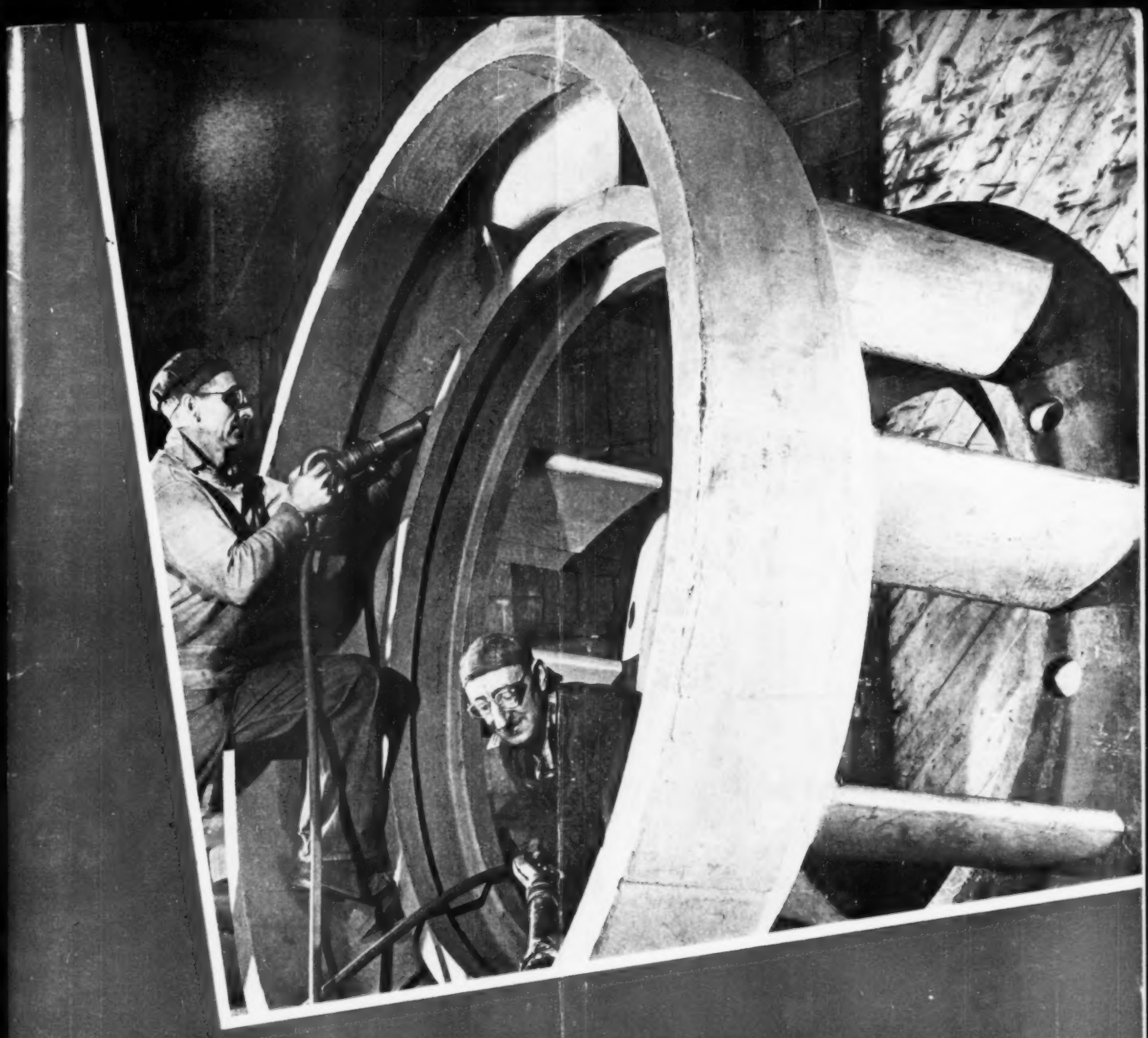


Safety Maintenance and Production

EST. 1901 AMERICA'S PIONEER MAGAZINE IN ITS FIELD

FIFTY CENTS SEPTEMBER, 1953

SIMPLIFY YOUR ORDERING...

Check Your Specialty Safety Needs with American Optical Company

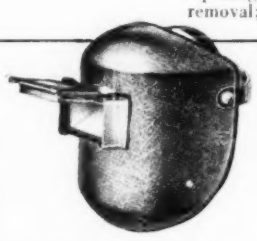
In addition to a complete quality line of safety glasses, respirators and protective clothing and gloves for industry, AO makes an extensive line of specialty safety products — 9 of which are shown. You'll simplify paper work and obtain products which *do the job* when you put specialties up to the "specialists in safety" — AO. Ask your nearest AO Safety Products Representative.

SPECIALTY SAFETY PRODUCTS

750 LENS CLEANING CABINET
12" long, 9" high, 6" deep. Wood. Contains lens cleaner, 6 oz. bottle and sprayer, cleansing tissues, anti-fog compound. Openings in front permit easy single sheet removal; openings at top for tissue disposal.

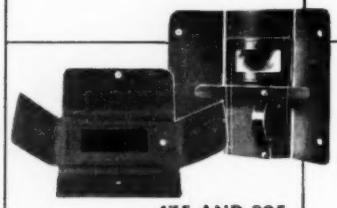
850 MAGIC LENS TISSUE AND DISPENSER
Tissues are silicone treated, strongly tear resistant, 50% larger than customary. Dispenser can be installed on any smooth surface without screws, nails or drilling. Pilfer proof.

101 GERMICIDAL DETERGENT
For cleaning and sanitizing respirators, goggles, helmets, etc. Won't stain or injure person or product. 2 ozs. make 1 gal. In 2 oz. or 1 gal containers.



704-3-C HELMET
All plastic with Plastic Lift-Front Glass Holder. Lighter than vulcanized fibre, strong, heat resistant. Impervious to moisture, won't warp, easily cleaned. Has new "S" 4-position adjustable helmet stop. Fits all heads comfortably.

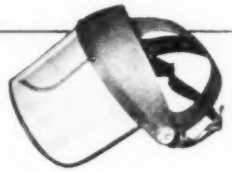
338 LADDER SHOES
Prevent costly falls. Tread on each shoe consists of 2 circular composition cork pads. Corks are interchangeable. For non-slip safety on floors of metal, slate, tile, concrete, wood.



475 AND 395 INSPECTORS' HAND SHIELDS
No. 475 folds to flat 5" for pocket storage. Leather glass holder and shield. 10" high by 12" wide, open. Filterweld plates and cover plates. Weight without glass 8 ozs. No. 395 of genuine Morocco, folds 4 ways. Weight only 2 ozs. without glass. Ask to see them.

150-A HAND SHIELD
Fabricated, fully insulated. Lightproof construction. Filterweld plates and coverplates.

109-B SWEATBAND
Absorbs 16 to 20 times its own light weight, of less than ½ oz. Nonirritating, nontoxic, comfortable, cooling. Can be washed or sterilized and used repeatedly. Pad is 7¼" cellulose sponge. Fits any head. Keeps production up, accidents down! Packed 25 to box.



F200 FACE SHIELD
Has standard spark deflector for extra protection. Interchangeable pivotal nut, spider and washer. Adjustable elastic headband may be worn low for extra comfort. Shield may be instantly thrown up when not in use — holds securely in "on" or "off" guard positions. Comfortable, durable.

American Optical
SAFETY PRODUCTS DIVISION

Ask for Specialty Safety Products Brochure S-1990

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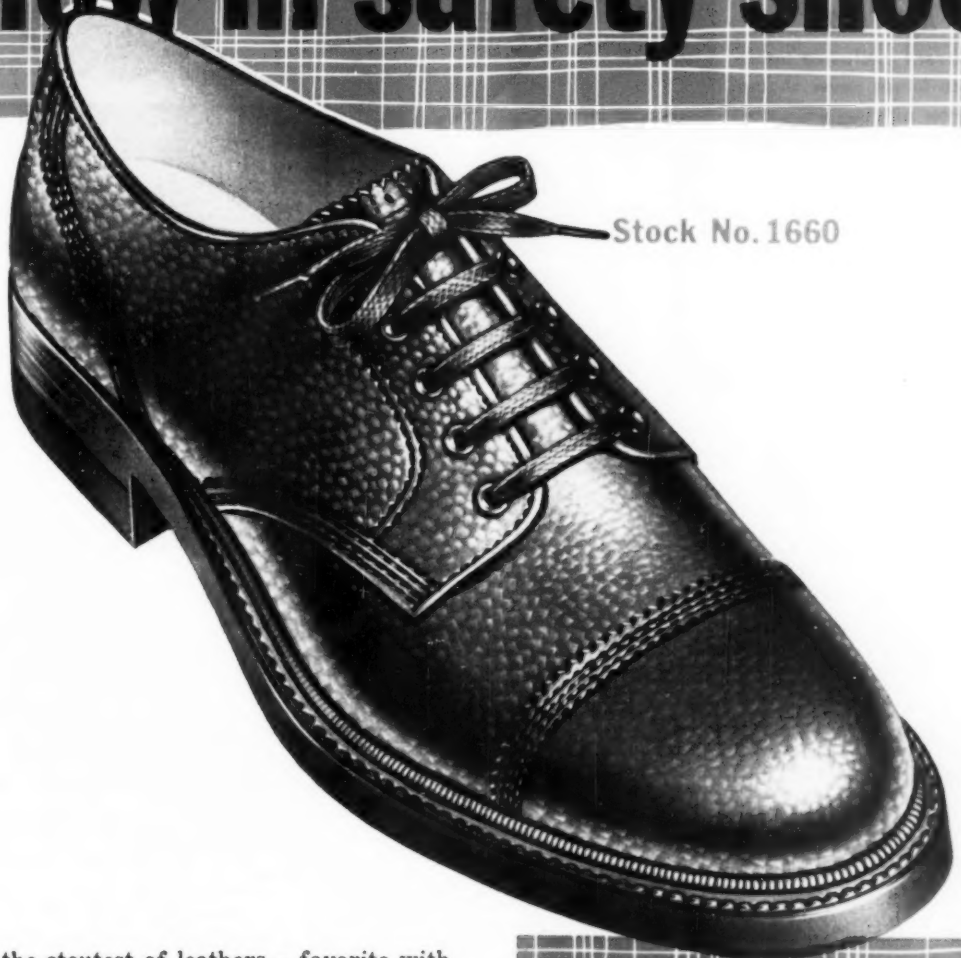
SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

(For copy of Special Brochure, use Key # J-3 on free Inquiry Card on page 81)

genuine Barrett

Scotchgrain

now in safety shoes



Stock No. 1660

One of the stoutest of leathers — favorite with most men for Fall and Winter street wear. Now Lehigh builds it into a rugged safety brogue, with zebra storm welt and triple-stitched seams — that's smart as any dress shoe sold. Put a pair on display to see what's switching more men to safety shoes than ever before in history.

LEHIGH

SAFETY SHOE COMPANY

ALLENTOWN, PA.

(For further details, use Key # J-4 on free Inquiry Card on page 81)

Published by Alfred M. Best Company, Inc., Publication Office, Columbia Turnpike, Box 232, Rensselaer, N. Y. Editorial and General Offices, Best Building, 75 Fulton St., New York 38, N. Y. Entered as Second Class Matter at Post Office at Rensselaer, N. Y. Under Act of March 3, 1879. Subscription rates, $4.00 Per Year in the United States; $5.00 in Canada; Foreign, $5.00. Single Copies, 50 cents. Publication Date 1st.

YOU GET COMFORT PLUS *BETTER EYE PROTECTION*

WATCHEMOKET **eye** SAVERS

Shatterproof
METHACRYLATE LENSES ARE SAFER

Eye-Savers exclusive methacrylate lenses never shatter or splinter with impact, do not pit from sparks. Clear and colored lenses absorb 96 to 100% of all harmful ultra-violet rays. Green lenses absorb sufficient infra-red for complete protection from a weld arc three feet away.

MODEL 440
with Methacrylate Lens
FOR HEAVY IMPACT

SOFT VINYL FRAME — FITS OVER LARGEST PRESCRIPTION GLASSES

Extra-soft plastic frame with soft nose flange form-fits snugly, yet comfortably, around facial contour . . . closes the gaps around nose and cheeks.

EXTRA WIDE REPLACEABLE LENS

The optically perfect, shatterproof methacrylate lens provides full protection against the heaviest impact. Lens is extra wide for picture-window vision. Improved metal lock bar holds lens tightly in frame. Frame acts as bumper to prevent scratching lens when laid face down.

VENTILATION AND COLOR STYLES

Available with *standard ventilation* shown in Model 440 (above) or *screen ventilation* shown in Model 441 (left) or *no ventilation.* Lens colors: Clear or light, medium and dark green.

MODEL 441
with Acetate Lens
FOR LIGHT IMPACT

Contains all the features of Model 440 except the lens is laminated acetate – optically perfect – light and comfortable to wear.

CHEEPEE

This low-cost, one piece acetate goggle provides safe, light-weight, comfortable eye protection. Exceeds federal specifications. Available in clear or medium green.

METHASPEC Model 55

Here is a low cost, shatterproof methacrylate eye shield, ideal for a visitor's goggle. Easy lens angling and Retrax temple adjustments assure perfect fit. Available in clear or light or medium green.

Quality Eye Protective Equipment ***Made by the Leaders in Plastics***

WATCHEMOKET OPTICAL CO., INC.

225 West Exchange St.
PROVIDENCE 3, R. I.

In Canada: Levitt-Safety Limited, Toronto 10, Montreal 1

(For further details, use Key # J-5 on free Inquiry Card on page 81)

QUALITY AT LOWER COST
WITH THE EYE SAVERS LINE!

SPLIT-JOINT Model 80
for Plano or Prescription

SPLIT JOINT SPREADS APART FOR EASY LENS REPLACEMENT

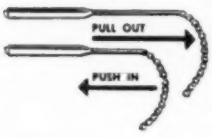
No need for special heaters. A simple operation, and lenses are quickly removed and easily inserted. All parts are standard and replaceable at low cost.

DOUBLE NOSE-BRIDGE DESIGN GIVES EXTRA STRENGTH

Bridge fits comfortably ON the nose at the geometric center between the eyes. No adjustment is needed. One size eliminates extra stock.

TWO FRAME SIZES AVAILABLE to hold 45 x 48 mm and 42 x 44 mm standard safety lenses. **RETRAX TEMPLES** shown below are standard.

EYE SAVERS "RETRAX" TEMPLES are easily adjusted to fit any head.



All Eye-Savers Spectacles are available equipped with new, light weight plastic Retrax temples that telescope in or out for perfect fitting. Plastic "ball-chain" hook design fits comfortably over the cartilage in back of ears and is self ventilating.

TUC-AWAY Model 415
for Lightweight Comfort

90% PROTECTION THAT'S WORN 100% OF THE TIME

Tuc-Away featherlight design is easy to wear . . . comfortable and attractive. Shatterproof, optically perfect, methacrylate lenses provide safe protection. Universal nose-bridge fits every face.

THREE LENS STYLES EASILY REPLACED: Snap-out, Snap-in

All methacrylate lenses absorb 96 to 100% of harmful ultra-violet rays. Available in clear or infra red absorbing light, medium or dark green.

Available in lens styles shown below.

SEMI-CUP LENS for side and bottom protection

FULL 1" SIDE SHIELD for complete side protection

REGULAR SIDE SHIELD for minimum side protection

RETRAX TEMPLES are standard on the Tuc-Away. Model 415 (Plastic Retrax) Model 412 (Metal Retrax). Also available with club temple Model 410.

Obtain complete details from your nearest authorized EYE SAVERS Jobber or write direct. New catalogs and prices are now available.

Quality Eye Protective Equipment ***Made by the Leaders in Plastics***

WATCHEMOKET OPTICAL CO., INC.

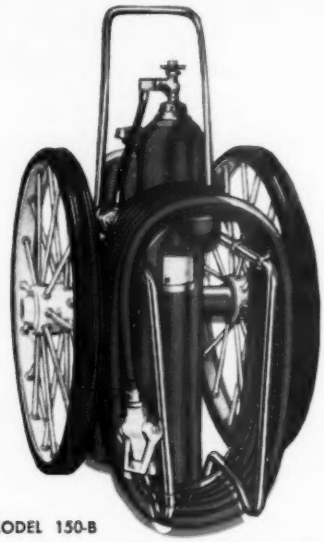
225 West Exchange St.
PROVIDENCE 3, R. I.

In Canada: Levitt-Safety Limited, Toronto 10, Montreal 1

(For further details, use Key # J-6 on free Inquiry Card on page 81)

NEW

ANSUL WHEELED FIRE EXTINGUISHERS *provide*



MODEL 150-B

. . . GREATER FIRE-KILLING CAPACITY . . . HIGH-SPEED OPERATION and EASIER MANEUVERABILITY . . .

MODEL 350-B

Ansul "B" Model Wheeled Extinguishers are completely new. Dozens of design changes have improved their operating characteristics as well as their appearance. They provide faster, easier extinguishment of fires almost twice as large as those handled by our "A" model wheeled extinguishers. New Ansul Wheeled Extinguishers are easier to move to the fire. They can be actuated faster. They'll put out more fire faster. They're easier to recharge and maintain. And they will give even more years of trouble-free service.

For a demonstration call your Ansul representative today. Or for additional information send for file number *W-50*.

ANSUL *Chemical Company*

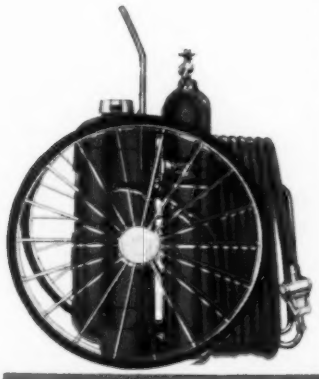
FIRE EQUIPMENT DIVISION • MARINETTE, WISCONSIN

MANUFACTURERS OF DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT, REFRIGERATION PRODUCTS, INDUSTRIAL AND FINE CHEMICALS AND LIQUEFIED GASES

(For further details, use Key # J-7 on free Inquiry Card on page 81)

NEW

ANSUL WHEELED FIRE EXTINGUISHERS *provide*



1. **Easier, Faster Operation**
2. **Greater Fire-killing Power**
3. **Easier Maneuverability**
4. **Greater Dependability**
5. **Easier Maintenance**
6. **Greater Safety for the Operator**
7. **Better Appearance**

ANSUL *Chemical Company*

FIRE EQUIPMENT DIVISION • MARINETTE, WISCONSIN

OFFICES AND DISTRIBUTORS IN PRINCIPAL CITIES IN THE U. S. A., CANADA AND OTHER COUNTRIES

THE FUTURE SHOWS

Harrisburg, Pa. *Sept. 16–17*

Pennsylvania Industrial Safety Conference (Hotel Penn Harris). Frank K. Bohl, deputy secretary, Dept. of Labor & Industry, Room 304 So. Office Bldg., Harrisburg, Pa.

York Harbor, Me. *Sept. 17–18*

Sept. 17–18. Twenty-Sixth Annual Maine State Safety Conference (Marshall House). A. F. Minchin, secretary, Industrial Safety Division, Department of Labor and Industry, Augusta, Me.

Chicago, Ill. *Oct. 19–23*

Forty-first National Safety Congress and Exposition. (Conrad Hilton Hotel.) R. L. Forney, general secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Boston, Mass. *Oct. 20–22*

Industrial Packaging and Materials Handling Exposition (Boston Mechanics Building).

Cincinnati, Ohio *Nov. 17–18*

Third annual Greater Cincinnati Safety Conference. (Sheraton-Gibson Hotel.) Kenneth R. Miller, executive director, Greater Cincinnati Safety Council, 1203 Federal Reserve Bank Bldg., Cincinnati 2, Ohio.

Fort Worth, Texas *Nov. 19*

Ninth Annual Fort Worth Industrial Safety Conference (Hotel Texas). L. W. Graff, safety director, Ft. Worth Safety Council, Majestic Bldg., Ft. Worth, Texas.

New Orleans, La. *Dec. 7–8*

Louisiana Safety Conference (Roosevelt Hotel). Charles E. Doerler, conference secretary, Caddo Bossier Safety Council, Inc., 610 Edwards St., Box 806, Shreveport, La.

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Insure Workers' Feet in Sure Protection

ANCHOR FLANGE

HY-TEST INTERNATIONAL SHOE COMPANY SAFETY SHOES

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SAFETY MAINTENANCE & PRODUCTION

FORMERLY "SAFETY ENGINEERING"

EST. 1901

VOL. 106, NO. 3 **SEPTEMBER, 1953**

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Cover: Goggles protect eyes against hazard of flying particles while men clean giant casting in plant of American Car & Foundry Company.

AMERICA'S PIONEER MAGAZINE IN ITS FIELD

SAFETY MAINTENANCE & PRODUCTION is indexed regularly by Engineering Index, Inc., New York

It's Safe to Say

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★ A CHALLENGE TO INDUSTRY

JUST as American industry faced the challenge of increased labor costs while stepping up living standards, so is it confronted with a new challenge of overcoming the high cost of industrial accidents by increasing efficiency of safety engineering. Together with employee cooperation and foreman supervision, management can make greater strides in lowering the cost of accidents by the recognition of a few basic facts.

Accidents can drain away profits and certainly "water" those profits. Moreover, their cost is reflected in the price of every commodity from a loaf of bread to a high-powered convertible. Therefore additional spotlights should be beamed to bring out the basic causes of accidents if we are to prevent recurrence.

It has been said that most accidents are caused by carelessness, a word so conveniently generic as to constitute a cover-all. What is carelessness? Is it fatigue traceable to insufficient rest or outside part-time jobs? Is it inability to bring to the job a high degree of concentration? Is it sheer bravado, wilful violation of safety regulations or a thoughtless lack of the self-preservation instinct? In any case "carelessness" should be spotlighted more adequately by a real fact-finding investigation and, if necessary, the employee should be brought up before the Shop Safety Committee to assure remedial measures.

To assist American industry find the answer to the challenge of high accident costs, SAFETY MAINTENANCE & PRODUCTION next month inaugurates a brand-new section in the magazine under the title of "Know The Law." This section will be edited by Henry M. Grosman who has earned an enviable reputation as a practicing attorney with offices in Newark, New Jersey. Mr. Grosman, a World War I veteran, is a member of the American Bar Association, the New Jersey Bar Association and of the Insurance Section of both those bodies, as well as the National Federation of Insurance Counsel. His outside activities embrace the American Legion, as past Commander of Newark Post #10 and organizer of the American Legion Memorial Hospital of Newark and President of its Board of Trustees for 12 years. By virtue of his attendance at New Jersey College of Pharmacy as well as the Law School of that State, Mr. Grosman brings to his field of a legal specialist in workmen's compensation, an unusual knowledge of physiology, anatomy and a flair for medical subjects infrequently found in the office of an attorney.

In his capacity as Editor of our new legal section, "Know The Law," Mr. Grosman will present feature articles and will review actual legal cases of significance to management vitally concerned with accident prevention. In addition, he will review and publish unusual cases of avoidable accidents details of which can be sent to SAFETY MAINTENANCE & PRODUCTION, with proper credit to the subscriber or his organization. Thus, our readers can obtain the benefit of others' experience to help prevent recurrences.

Watch for Attorney Grosman's section "Know The Law" starting in the October issue of SAFETY MAINTENANCE & PRODUCTION.

★ OPERATION WISE OWL

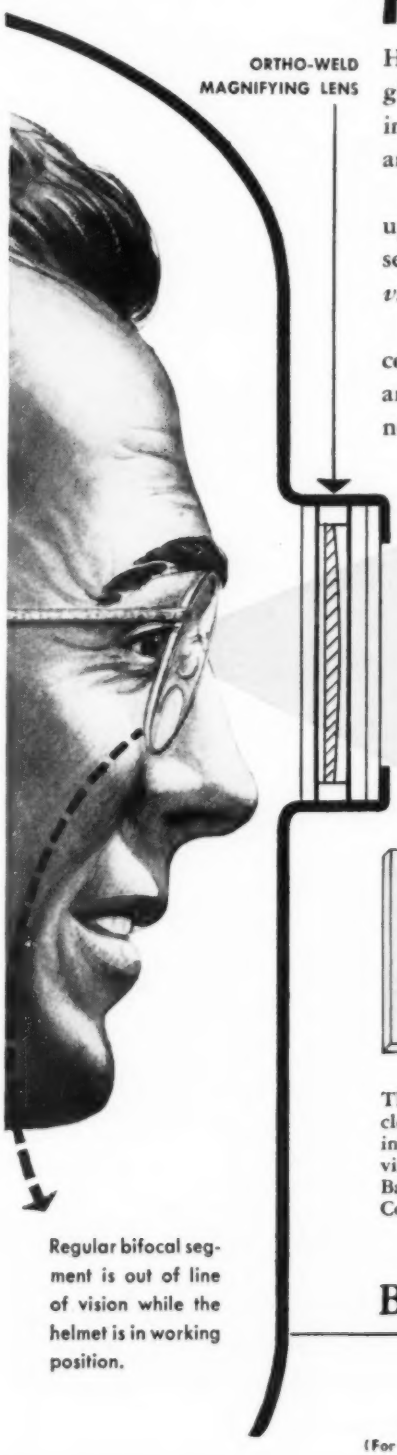
UNDER this title, there appears elsewhere in this issue an article tracing the origin of the Wise Owl Club whose members owe their eyesight to a narrow escape from eye injury through the medium of wearing eye safety equipment. Back in 1947, the St. Louis plant of American Car and Foundry Company received through its company magazine a suggestion from employee Joe Folks to start a national club for workmen who had saved their sight by proper eye protection devices. Thus there was born a national movement destined for a vitally important place in American industry.

The National Society for the Prevention of Blindness, the nationwide vision conservation organization, was selected to administer the Wise Owl Club on a non-profit basis. James E. O'Neil, the progressive Director of Industrial Service for the Society emphasizes the savings in human suffering, compensation costs and production plus the inestimable amount of management-labor goodwill engendered by the national drive to save vision and prevent the tragedy of blindness. Mr. O'Neil reports that eligible members of the Wise Owl Club are given a gold Wise Owl pin and a certificate of membership in special presentation ceremonies.

Every Wise Owl represents an eye saved. May the roster of membership continue to grow beyond the fondest dreams of American Car and Foundry and their inspired employee, Joe Folks who needs no "selling job" on eye safety products! H.A.

BAUSCH & LOMB

NEW! Ortho-Weld MAGNIFYING LENSES



Regular bifocal segment is out of line of vision while the helmet is in working position.

Here's greatly improved vision for the welder who wears glasses with bifocal lenses. Ortho-Weld magnifying lenses improve his comfort, skill and productivity—reduce fatigue and eyestrain.

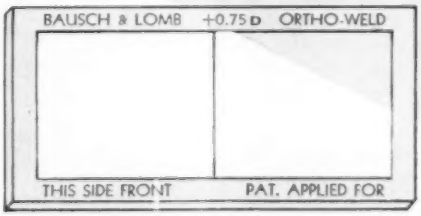
With Ortho-Weld, the worker gets the clear, sharp, close-up view normally provided by the near point, or reading segment of his bifocals—the segment which is *out of line of vision* while his helmet is in working position.

Easily inserted between the filter lens and rear cover plate in the lens holder, Ortho-Weld lenses are available in 4 "strengths," or powers, fitting the needs of most welders who wear bifocal lenses.

Welders get clear, comfortable, close-up view . . .

for welders who wear bifocal lenses . . .

at all angles . . . up, down, and to the side.



The Ortho-Weld is precision molded in one piece from crystal-clear lucite. It consists of two lenses surrounded by a supporting frame. Each lens is adequately centered for comfortable vision, provides full use of the helmet window. Ask your supplier of Bausch & Lomb protective eyewear, or write: Bausch & Lomb Optical Company, 90521 Smith St., Rochester 2, N. Y.

BAUSCH & LOMB *Safety Eyewear*

1853 1953 INTO A NEW CENTURY OF OPTICAL PROGRESS
BAUSCH & LOMB CENTENNIAL

(For further details, use Key # J-10 on free Inquiry Card on page 81)

Approved by New York City Bureau of Standards and Appeals No. 932-49-SA.

Millions of dollars in water damage to stock and equipment is caused annually by sprinkler systems which continue to release floods of water after the fire is out! Even in the absence of fire, an unexpected mechanical failure can cause a sprinkler head to operate, causing tremendous, unnecessary water damage.

Now you can protect your plant with "Sprinkler-Stopper," a valuable device which, when inserted into the ring of a sprinkler head, instantly stops the flow of water, but leaves the rest of the sprinkler system operative. As the sprinkler control valve need not be turned off, the plant is still protected against fire until all danger is passed.

Already in use in hundreds of plants, warehouses and public buildings, a "Sprinkler-Stopper" placed beside each fire extinguisher is a vital piece of equipment. "Sprinkler-Stopper" will prove of tremendous value in the event of fire, or if a mechanical failure should cause a sprinkler head to operate prematurely.

"Sprinkler-Stopper" is manufactured in two styles, Model A and Model B, which will accommodate virtually all of the sprinkler heads in current use. Be sure to specify the type head in your plant when requesting information.

Write for free catalog to Department P2

SPRINKLER-STOPPER SALES COMPANY

409 Grand Avenue Englewood, N. J.

(For further details, use Key # J-11 on free Inquiry Card on page 81)

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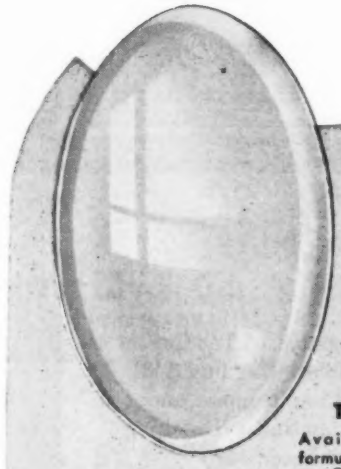
How to Keep Protection Over Every Worker's Eyes

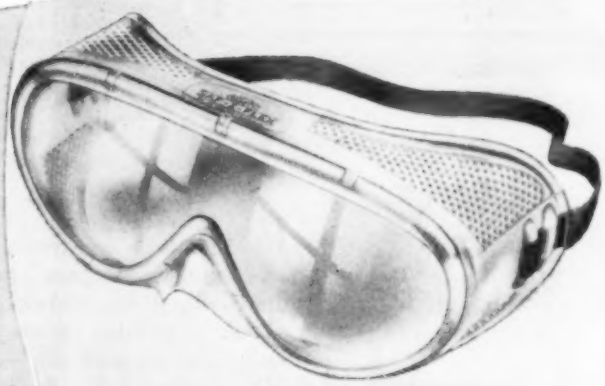
Comfort Does It!

DESIGNED WITH "EMPLOYEE ACCEPTANCE" FOREMOST IN MIND



THE SAF-I-LENS

Available in two special formula optical plastic, Optilite ® A and Optilite B which weigh less than half as much as glass, offering perfect comfort. (Available in 44 and 47 MM — 6 curve drop oval.) Meet Federal Spec. for impact.

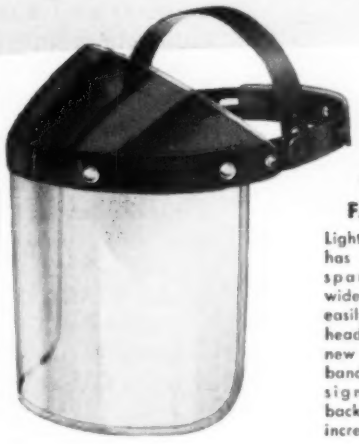


THE SAF-I-FLEX

Has velvet soft VINYL frame, generous grid vents to prevent fogging, optically correct Optilite Lens and is extremely light in weight, offering perfect comfort.

THE SAF-I-SPEC

Feather-lite in weight — has velvet soft nose piece and optically correct Optilite Lens offering perfect comfort. Meets Federal Spec. for impact.



THE HALO FACE SHIELD ®

Light as a halo — has transparent plastic spark protector for wide angle vision — is easily adjusted to all head sizes and has new leatherette sweatband and newly designed sheath over back of headband for increased comfort.

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PRECISION

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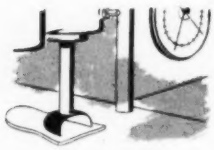
IMPACT



COMPRESSION

PRODUCTION

Precision is the watchword we live by here at Safety Box Toe Co. . . . from the conception of the basic idea on the drawing board all the way up to the finely engineered safety steel toe. Number one on our production parade is the expert selection and painstaking analysis of the steel that goes into our products. Later, each individual steel toe is austempered to assure uniform hardness and toughness so vital to modern foot safety.

Critical spot checking occurs frequently along the line while our highly specialized laboratories make use of exclusive testing devices to keep a sharp overall eye on the quality of the product. Within our organization investigation and research are constantly at work to discover new materials, the most efficient and economical machinery and methods. The purpose of this activity, obviously, is to anticipate and keep well abreast of every safety toe trend. From two very busy fabricating plants, fully equipped with every needed skill and technical facility, flow millions of safety steel toes to meet the demand in this country and foreign markets . . . safety toes for dress, semi-dress, work, rubber footwear, and women's wear, all in a range of styles and sizes. And of course, those increasingly popular WINGUARDS 400 and 500.

Safety Box Toe Co. welcomes—and solves *tough* safety toe problems. We invite progressive safety shoe manufacturers and safety engineers to draw upon our vast experience and proven techniques.

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SAFETY
MAINTENANCE
& PRODUCTION

Joe Folks, American Car & Foundry Co., employee, inspired the origination of the Wise Owl Club of America through his suggestion to the editors of the company publication. In 1947 Folks' vision was saved by eye protective equipment.

Operation Wise Owl

AT a recent national convention, a group of well-known factory managers were renewing old friendships and company notes on their accident prevention programs. One of the group, George L. Mitsch, manager of the American Car and Foundry plant in St. Louis, Missouri, listened attentively until the conversational spotlight turned on him.

"When it comes to saving eyes, I've got you all topped," he said. "The greatest eye safety idea in use today—the Wise Owl Club—originated in my plant. Joe Folks sure came up with a honey when he sent that to the company magazine."

Mr. Mitsch was right—it was a honey of an idea, and it packed enough wallop to grow into one of the most popular mass eye safety incentives ever known.

In 1947, when Joe Folks was working as a grinder in an ACF foundry, a flying chip of metal cracked his safety goggles. The mishap would have resulted in certain blindness—but for the eye safety equipment he was wearing.

That was when Joe got his big idea—why not form a club for workmen who had saved their sight, as he had, by wearing proper protection? Why not give them some distinctive award, similar to the pin given to members of the Caterpillar Club, composed of airmen who used parachutes to save their lives? Thus the Wise Owl Club came into being, and was immediately taken up enthusiastically by all the ACF plants.

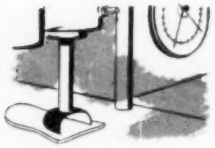
However, the Wise Owl Club caught the imagination of safety directors of other companies and ACF management realized that the Wise Owl movement appeared destined to play an important role in the American safety movement. The National Society for the Prevention of Blindness, nationwide vision conservation organization, was selected to promote and administer the Wise Owl Club nationally on a nonprofit basis.

(Continued on page 28)

PRECISION

AUSTEMPERING

IMPACT



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SAFETY MAINTENANCE & PRODUCTION

VOL. 106 No. 3 • SEPTEMBER 1953

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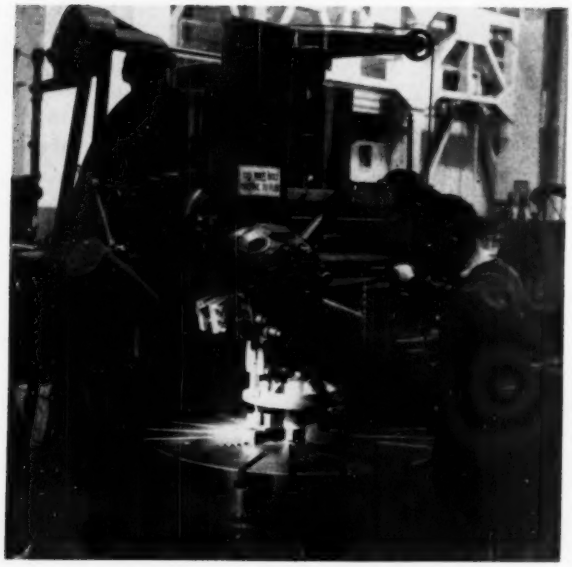
(Continued on page 28)

GOOD MACHINE

A 40-watt filament lamp behind diffusing opal glass is answer to problem of removing burrs from motor housing without eyestrain.

Machine shop uses improved luminaires and high reflectance finishes. Note contrast in reflecting surfaces for good visibility.

SPECIFIC LIGHTING + GENERAL LIGHTING



A 150-watt reflector lamp in a shielded luminaire aids turret lathe operator to see operation of cutting tool clearly without glare.

By QUENTIN P. DOBRAS
Lamp Division
General Electric Co.
Cleveland, Ohio

FEATURE

Second article of a feature series on proper lighting. The next article will appear in the October issue.

INDUSTRY is being called upon today for ever-increasing production. The machinist plays an important part in achieving these production goals.

If the machinist is to work most efficiently he needs good illumination. The rate and quality of his production depend heavily upon his ability to see the task easily and comfortably over long periods of time. The seeing tasks in machine shops vary widely in their lighting requirements. Some tasks are best lighted from an overhead system, while others require a specific quantity or quality of lighting in addition to that obtained from the general lighting.

In designing a lighting system there are several aspects which must be considered: the illumination level necessary for the seeing tasks; the control of brightnesses; the minimizing of reflected and direct glare and the elimina-

SHOP LIGHTING . . .

This shop has same illumination level as previous picture, but only dark surfaces and unbalanced lighting producing eyestrain.

This picture shows small supplemental lights for close work and adequate general lighting for comfort—an ideal combination.

— GLARE = GOOD LIGHTING

tion of harsh shadows. General overhead lighting and local supplementary lighting work hand-in-hand toward achieving these requirements for a good lighting system. The first consideration, however, is to provide a foundation of good general lighting.

General Lighting Systems

The illumination level for machine shops recommended by the Illuminating Engineering Society varies from 20 to 200 footcandles depending upon the type of work involved. A general lighting level of 50 to 100 footcandles is installed in modern shops today. This level is adequate for many of the tasks in the shop without the need for supplementary lighting.

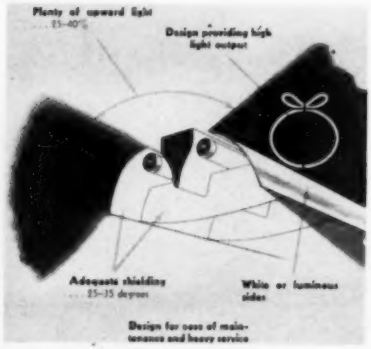
A uniform lighting level is generally desirable throughout the shop. This has the advantage of permitting moving or installing machines for maximum efficiency with uniformly good seeing conditions for the machinists. Uniformity is achieved by proper spacing of overhead lamps. A simple rule for fluorescent luminaires is to have the spacing between units no greater than their mounting height from the working plane. The lighting level also tends to be less near the walls than in the center of the area. This fall-off in illumination may be compensated for by mounting more luminaires or higher wattage lamps near the walls.

Control of brightnesses in the entire work space is one aspect that is frequently overlooked. The brightness of a surface is determined by the amount of light that is reflected from it. Ideally, for maximum comfort the brightnesses in the field of view should be nearly uniform. Constant adaptations of the eye to large brightness differences is an important cause of visual stress and eye fatigue.

Brightness control can be attained by a well designed lighting system combined with the proper choice of high reflectance finishes for all surfaces in the shop. This includes not only the ceiling and walls but also the machines, benches and floor as well. The benches, machines and floor must have a light finish to provide comfortable brightnesses surrounding the actual seeing task. The following table shows the recommended reflectance values published by the Illuminating Engi-

neering Society in the American Standard Practice for Industrial Lighting:

REFLECTION FACTORS	
Ceiling	80%
Walls	60%
Desk & Bench Tops	35%
Machines & Equipment	25 to 30%
Floors	Not less than 15%


Plenty of upward light
Design providing high light output
Adequate shielding
White or luminous sides
Design for ease of maintenance and heavy service

Industrial luminaire reduces brightness contrasts by directing 25 percent of the total light upwards and provides good shielding.

Overhead Lighting

An extreme brightness difference between the luminaire and the ceiling is a major factor in creating discomfort. Recently industrial luminaires which considerably reduce these contrasts have been developed. These are units which have about 25 percent of their total light output directed upward. This upward component of light brightens the ceiling which reduces annoying brightness contrasts and gives the area a more spacious and cheerful appearance. The efficiency is improved by the free circulation of air through the unit. This circulation carries off much of the heat from the lamps and permits them to operate at a cooler and more efficient temperature. The circulation of air also carries with it dirt and dust particles that would otherwise tend to settle on the reflector. The shielding of the lamps has been increased from the previous 13° to 25°–35°. This increased shielding angle was determined as the minimum necessary to reduce bothersome direct glare of the lamps in the normal field of view.

These fixtures are also designed to provide easy maintenance. Good maintenance is necessary for any lighting system if reasonable efficiency and satisfactory appearance are to be realized over a long period. For the most economical operation of the lighting system a regular scheduled maintenance program should be established.

Checking Glare

Reflected and direct glare is affected primarily by the finish on the seeing task and its surroundings and by the type of lamp and its shielding. Three types of lamps are available—mercury, filament, and fluorescent. Fluorescent lamps have advantages of high efficiency, low-brightness, and a linear source of light that lends itself well to a uniform and shadow-free lighting system. The higher brightness sources, filament and mercury, are considered for some areas where the mounting height is 20 feet or higher. Since these lamps are available in much higher wattages, less lamps are used for a given lighting level and the initial cost of the installation is generally less. Maintenance costs are also less due to fewer fixtures to clean and relamp. Since machinists are working mainly with specular or shiny materials, low brightness fluorescent lamps are most satisfactory.

Windows and skylights may also be sources of glare. High brightnesses of the sky, clouds, and nearby buildings are annoying to workers who must face the windows. Large hourly, daily, and seasonal variations in the amount of natural daylight available make it unreliable as a source of illumination. Furthermore, on dark days or at night the lighting level from the artificial lighting system is reduced because of transmission through the glass. Many shops find that painting the windows the same as the wall is the most satisfactory solution.

The elimination of harsh shadows is accomplished by having many light sources illuminating the seeing task. The ideal method to eliminate shadows is by using indirect luminaires (which in effect makes the entire ceiling a light source) or by a luminous type ceiling. Both of these methods are usually too costly and inefficient for use in a machine shop. Placing the fixtures in continuous rows is good practice but where shadows present a serious problem, a better solution is to add units perpendicularly between the rows to form a grid pattern. The use of fixtures with upward light is recommended because light reflected from the ceiling also helps reduce shadows.

More attention must be given to all these aspects of good lighting design than was necessary 20 or even 10 years ago. Brightness differences are not as apparent or annoying at 10 to 20 footcandles as they are at 50 to 100 footcandles. The complaint of "too much light" can often be more accurately attributed to excessive glare from poorly shielded fixtures or high brightness contrasts.

Supplementary Lighting

Some seeing tasks cannot be adequately illuminated by a general lighting system. Precision grinding and polishing may require 100 to 1000 footcandles for good visibility. Some machines may partially shield the task from the overhead lighting which will reduce the illumination where it is needed most. In either case, the proper use of local lighting will improve visibility.

Each seeing task must be carefully analyzed as to the object to be seen, its immediate background, and its general surroundings. In specifying supplementary lighting, consideration must also be given to the comfort of the workers. The fixtures should be well-shielded and positioned to prevent direct glare in the operator's eyes and those of nearby workers. Brightnesses must be carefully controlled by proper reflectances and close coordination between the lighting levels of the general and supplementary lighting systems. It is desirable to keep the brightness of the task not much

Fawick Airflex Division, Federal Fawick Corporation plant in Cleveland, Ohio, looks clean, bright and pleasant three years after being painted according to COLOR DYNAMICS.

Better, Safer Working Conditions... with Pittsburgh COLOR DYNAMICS*

Choice of right colors for walls, ceilings and machines improves workers' morale, reduces housekeeping and accident hazards in modern plant of largest manufacturer of pneumatic clutches and brakes.

FAWICK Airflex *Trade Mark Reg.

THE THREE-YEAR experience of Fawick Airflex with Pittsburgh COLOR DYNAMICS adds convincing proof that wise and careful use of color is a profitable investment that benefits both management and workers.

● **The Fawick Airflex Division** of the Federal Fawick Corporation is the largest manufacturer of pneumatic clutches and brakes for all types of industrial machinery.

● **This plant** was painted according to COLOR DYNAMICS early in the summer of 1950. Morale-building colors with high light reflectance were used on ceilings and upper walls, making the entire work area brighter and more cheerful. Eye-rest colors were used on lower walls to lessen eye fatigue. The machinery was painted with focal and eye-rest colors to permit the operator to see his job better. Safety colors were applied on operating controls, mobile equipment and traffic lanes to increase safety.

● **No better summary** of the satisfactory results that were achieved can be made than this comment by R. S. Huxtable, President of the Federal Fawick Corporation:

● **"COLOR DYNAMICS** has raised efficiency and productivity in our plant. Also, we are certain that the improvement in morale and in our relations with the working force has fully justified our selection of COLOR DYNAMICS. Being proud of their pleasant surroundings, our employees help to keep their work areas clean. This simplifies housekeeping. Moreover, we have been most pleased with the way Pittsburgh Paints have held up."

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● Painting your plant according to COLOR DYNAMICS costs no more than a conventional maintenance job. Why not investigate what this modern system of putting color to work will do in your factory or office? Send for our free book which explains what COLOR DYNAMICS is and how it works. Better still, call your nearest Pittsburgh Plate Glass Company branch and ask to have a representative give you a color engineering study of your plant, or any part of it, without cost or obligation. Or mail this coupon.

SEND FOR THIS FREE BOOK!

Pittsburgh Plate Glass Co., Paint Div.
Department SM-53, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your booklet "*Color Dynamics.*"

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PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS • FIBER GLASS

PITTSBURGH PLATE GLASS COMPANY

IN CANADA: CANADIAN PITTSBURGH INDUSTRIES LIMITED

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greater than that of its surroundings.

Therefore, to achieve comfortable seeing conditions for critical tasks, a high general lighting level is necessary even though sufficient illumination to see the task is obtained from supplementary lighting.

Either filament or fluorescent lamps can be used for supplementary lighting with each having advantages in certain applications. Filament lamps may be used where extra illumination is needed over a small area. They are also useful where lighting of a very directional nature is needed. The light source is small and can be placed out of the way so that the unit does not directly interfere with the operator's line of vision. Increasingly popular lamp types for supplemental use are projector and reflector lamps. These lamps have an integral metal reflector on the inside of a blown or molded glass bulb. They have the advantage of good light control and a high light output throughout life. The reflector on the inside of the bulb cannot get dirty so that very little cleaning is necessary.

Fluorescent Applications

Fluorescent lamps also are used for many applications of supplementary lighting. This low brightness source is often used for illuminating very shiny or glossy objects where a concentrated source would cause excessive reflected glare. Reading micrometers and calibrated dials is much easier under fluorescent lamps due to the more diffuse reflections. Fluorescent lamps are a comparatively cool source. This is important where the operator must work in close proximity to the light source.

Fluorescent lamps may be used where the seeing tasks are large or irregularly shaped. The linear source of light produces more uniform illumination with fewer lamps and reduces harsh shadows formed by the irregular shapes.

By creating a comfortable working environment with a good lighting system, the worker's ability to see is improved. Many tangible benefits accrue such as: increased production, fewer accidents, better quality of workmanship, better utilization of floor space, and better housekeeping. In addition, the morale of workers will be improved.

Benefits of Good Lighting

As seeing becomes easier less time is consumed in setting up the machine, detecting minute details and flaws, and in making accurate micrometer readings. A few seconds saved per operation will result in more time for productive work. If the machinist can perform these operations under comfortable seeing conditions, he will be more careful and less likely to make mistakes.

The managements of many industrial plants have collected data which indicate that the frequency of accidents has decreased after a new lighting installation. For example, one large manufacturing company noted a decrease of 32 percent in the number of accidents after relighting. After relighting, the area was repainted with proper reflectance paints and a decrease of an additional 16½ percent was reported.

Better housekeeping is also a benefit of good lighting. Dark corners and harsh shadows under machines and benches are places where all types of debris accumulate. Certainly such conditions are not as conducive to high employee morale and pride of workmanship as a clean and orderly machine shop. The possibility of fires and accidents is also increased under such conditions. A uniform lighting system also means better utilization of floor space. Machines can be moved or installed to provide the best placement for efficient operation.

The End Product

Good lighting helps reduce eyestrain and fatigue among the employees. Older workers and even many of the younger employees often have various visual defects to overcome. Good illumination that is tailored to individual needs may help these workers and permit them to do the precision work in which their training and experience are of most value. Machine shops have one of the highest investment rates per man of all industrial areas. Therefore, an investment in good lighting is well justified because it will help achieve the maximum utilization of machines and facilities and provide good employee morale.

Pictures by courtesy of General Electric Co.

For detailed descriptions of lighting fixtures see pages 459–471 of "Best's Safety and Maintenance Directory," 1952–53 edition.

CHEMICAL SAFETY ENGINEER

To Head Divisional Safety Dept.

We are an old well-established midwest chemical manufacturer who has a substantial opening in our safety program. To fill this we want a man with a positive and persuasive personality who is capable of inaugurating, "selling" and carrying out a comprehensive safety program.

He must have a degree in chemical engineering or chemistry with at least 5 years responsible industrial safety experience in a chemical manufacturing plant. Preferably he should be a member of the American Society of Safety Engineers.

The man selected will be given responsibility for the safety program of a large division of the Company, will be expected to direct the work of others in the divisional safety department and will be paid a salary commensurate with the responsibilities involved.

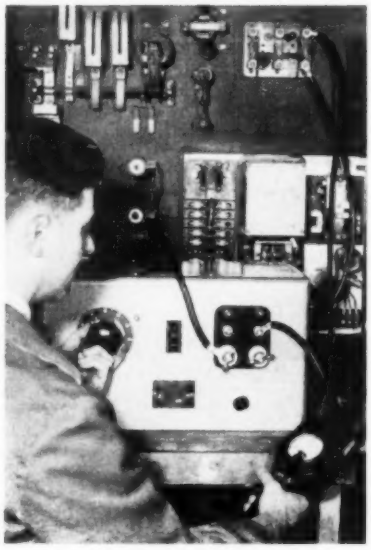
Please submit complete resumé of personal data, education, previous experience, salary received and expected and references, in that order. All replies treated in confidence.

BOX 65

SAFETY MAINTENANCE & PRODUCTION

75 Fulton St. New York 38, N. Y.

DON'T GUESS...



1. Inspect and test all incoming current actuated protective devices to make certain that they are received from the manufacturer in good condition.
2. Inspect and test the protective device immediately after installation to be sure it is operating properly.
3. Set up periodic inspection procedure so that the protective device is inspected and tested at least once per year in normal service and more frequently in corrosive or high temperature applications.

With this new type of testing equipment, the procedure is simple and safe. At present, the selection of the proper tripping element is often left to chance. For the most part, elements are chosen from manufacturers' tables which are based on average tripping times for average motors. However, articles published by leading manufacturers of motor starters and overload relays state quite clearly that commercial overload relays are at best a compromise . . . with their tripping characteristics selected to protect a majority of commercial motors. The considerable differences in numerical values that exist in motors of different sizes, different lines and different manufacture due to differences in the electrical loading of the copper and iron in the motor, and differences in heat dissipating ability make it impossible for the overload relays to be anything but a compromise and a guess. In addition, thermal overload relays are designed to follow the heating curves of motors, but because of relay standardization, this too is but a compromise with reality.

Overload relays for motor applications are designed on the inverse time principle, i.e., the tripping time varies inversely with the motor current. When the proper overload element is in service the relay should not trip at rated full load current, but should trip in less than 13 seconds when the current is 600 percent of the rated current, for most motors. For accuracy, the relay should be tested at two or more points on the motor time-current curve. In order to determine the ultimate conditions for a motor, it is best to procure the manufacturer's data sheet for the motor. This will tell how long the motor can tolerate locked rotor as well as intermediate overload currents.

CHECK—Your Overload Relays!

By MEL COBEN
Executive Vice-Pres.
Multi-Amp Corp.
Harrison, New Jersey

IT'S A paradox that, in spite of the multiplicity of protective devices such as fuses, circuit breakers and overload relays and in spite of all that has been written on the care and maintenance of electrical systems—electrical fires and burned out motors continue to take a large share of the multi-million dollar maintenance bill. It has been estimated that 20 percent of all industrial fires last year were caused by electrical disturbances. This percentage attributed to electrical disturbances can be cut substantially by the use of testing equipment designed to check current actuated protective devices quickly, safely and economically. Portable high current test units now make it possible to be sure that current actuated protective devices are actually protecting.

For the best results it is recommended that the following checking procedure be employed:

Before testing the overload relays, determine the check points by reference to the motor manufacturer's data sheet; or, if this is not available, by reference to the typical calibration table, below. In order to use the table below, check the

TYPICAL CALIBRATION TABLE

% MOTOR F.L.C.*	TRIP TIME Minimum–Maximum
100	
150	2½ min.–4 min.
200	1 min.–1¼ min.
250	45 sec.–55 sec.
300	30 sec.–40 sec.
350	25 sec.–30 sec.
400	18 sec.–25 sec.
450	15 sec.–18 sec.
500	13 sec.–17 sec.
550	10 sec.–14 sec.
600	8 sec.–13 sec.

* F.L.C.–Full load Current

Example: Assume that it is desired to test a relay for a 60 horsepower, 220 volt, 3 phase, squirrel motor, rated 150 amperes at full load. Checking the table at the 300 percent (450 amperes) load we can readily see that the relay should trip within 30–40 seconds. The figures given in the table above are calculated to give the average motor maximum protection.

rated full load current on the nameplate of the motor.

Here's the step by step procedure for testing overload relays with the new portable high current testing units:

1. Open the line disconnect switch to the motor.
2. Plug the test unit into any convenient electrical outlet. Connect the common terminal to one terminal of the overload relay heater or tripping element, and connect the suitable current terminal to the other terminal of the overload relay.
3. Hook in an ammeter. If clamp type is available place it around one of the output cables running to the relay.
4. Throw the circuit breaker of the test instrument on and adjust the control knob until the desired current is obtained.
5. Throw the circuit breaker off and wait two to three minutes for the element to cool.
6. With the adjusting knob in correct position, throw the circuit breaker on and note the time required for the overload relay to trip.

Testing Hints

The ideal test is one in which the maximum operating conditions of the motor are accurately simulated. Motors subject in service to periodic overloading should have their overload relays tested by heating the elements with the rated motor current for several minutes, then abruptly increasing the current to the overload percent. In this way, an accurate indication of the tripping time of the relay for the conditions under which it must serve, is obtained.

If the period of time it takes the overload relay to trip exceeds the time indicated in the table, the relay is not protecting the motor and the tripping element should be replaced with one having a lower current rating. If this period is less than the minimum time indicated on the table, the motor will be tripped off the line unnecessarily, and the element should be replaced with one having a higher current rating. If the overload relay is adjustable, it can be precisely adjusted to trip at a point giving the maximum service from the motor without danger of burn out.

Since it now is possible to test and calibrate current actuated devices easily, quickly and with complete safety, there is no longer any reason to guess—it is now possible to be certain that protective devices are really protecting. This certainty should add up to a savings of millions of dollars worth of time, equipment and materials.

Picture by courtesy of Multi-Amp Corp.

Lots of Color Makes Plant Safe

COLOR scheming that might make a home decorator shudder is saving lives at the Star Woolen Company at Cohoes, N. Y. Richard Levi, company treasurer, reports that the bold use of orange, blue, yellow, gray and black have played an integral part in a safety drive which has reduced the accident frequency rate by 76 percent in 6 years. "This reduction is particularly outstanding in the garnetting industry," Mr. Levi adds, "Because this industry has one of the highest accident frequency rates in the entire textile field."

The long range safety program has incorporated the use of color by having each color—including an alert orange and a precaution blue—designate a specific danger. According to Mr. Levi, setting up a safety program was not an easy thing to do in a garnetting plant because most such plants are small and full fledged safety programs are relatively new. "Picker and garnetting machines have a number of inherent hazards which are very difficult to guard," he says. "Obviously, you can't guard the point of a saw without making it useless." A third problem was the high ratio of man hours spent on hazardous machinery to the number on non-hazardous machinery.

"The solutions to these problems were based on three major principles of accident prevention work:

1. Creating and maintaining interest among all personnel in the program.

2. A consistent fact finding program to uncover dangers in methods, machines and material movements which can be lessened or removed.

3. Immediate, effective corrective action when a hazard has been found.

"In addition to installing the necessary guards on machines and educating the workers to do their job the right way . . . the psychological use of color markings on the machines contributed to the success of the program," Mr. Levi continues.

"On garnetting machines, for example, the use of color paints reduced considerably the number of accidental injuries. The color scheme included the use of horizon gray on the outside of machine frames. Alert orange was painted on all moving parts, such as gears, sprockets and pulleys. Precaution blue, applied to such areas as roll covers, arches and locations near moving machinery, signaled workers to approach with care. Yellow, a highly visible color, was used on all guards, the insides of all garnet frames, and the ends of moving cylinders, while an additional precaution was taken by painting a black stripe across the ends of moving rolls.

The use of color in the safety program was carried even further by painting upright beams and other parts of plant interior in highly visible shades, particularly yellow. This gives visibility at all times, even in smoke and fog conditions.

Mr. Levi said that future plans for the company's safety program include a more intensified educational program among employees to lessen accidents caused by carelessness, indifference and blunder; and a plan to bring in job safety analysis on plant-wide scale.

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BIRMINGHAM, ALA.
Guardian Safety Equipment Co.
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BOSTON, MASS.
General Equipment Corporation
261 Franklin Street

BUFFALO, N. Y.
The Watson Company
1443 Main Street

CHICAGO, ILL.
Universal Safety Equipment Co.
5115 Diversey

CINCINNATI, OHIO
Williams & Co., Inc.
3231 Fredonia Avenue

CLEVELAND, OHIO
Williams & Co., Inc.
3700 Perkins Avenue

COLUMBUS, OHIO
Williams & Co., Inc.
851 Williams Avenue

DETROIT, MICH.
Averill Equipment Company
19225 Conant Avenue

EAST ORANGE, N. J.
Guardian Safety Equipment Co.
491 Prospect Street

HOUSTON, TEXAS
Guardian Safety Equipment Co.
1915 A Westheimer

INDIANAPOLIS, IND.
Averill Equipment Company
1917 North Goodlett

KANSAS CITY, MO.
Safety, Incorporated
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KNOXVILLE, TENN.
Safety Equipment Distributing Co.
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Fire Appliance & Safety Co.
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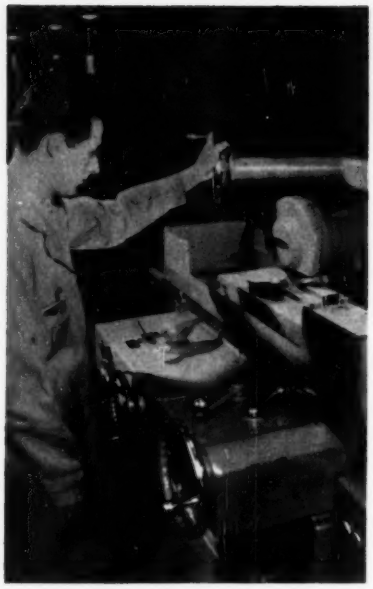
CESCO FOR SAFETY

(For further details, use Key # J-14 on free Inquiry Card on page 81)



IF YOU USE

By RALPH N. S. MERRITT
Product Safety Engineer
Norton Company
Worcester, Mass.

THE sudden disintegration of a grinding wheel can be one of the most dangerous of industrial accidents. Sharp, hard pieces of abrasive flying about in all directions at great speed can seriously injure a man almost before he knows what has happened.

Yet, grinding is not a dangerous occupation. Hundreds of thousands of grinding wheels are used daily with only occasional accidental breakage which need never result in injury. Following the proper safety rules in inspection, storage, mounting, operating and guarding the grinding wheel will cut accidents to a minimum and reduce injuries to nil. If there is any temptation to neglect strict enforcement of these rules, recent damage suits with awards as high as 150,000 dollars for a single accident should be sufficient reason for compliance with the code.

The initial responsibility for safety lies with the grinding wheel manufacturer. It is his duty to see that the wheel is properly made, tested and packed for shipment. However, he cannot make a grinding wheel that is so strong that it will never break. The strength of a grinding wheel is limited by the grinding operation it must perform. No manufacturer can make a wheel with greater strength than is required by the grinding operation on which it will be used.

The bonding agent must be just strong enough to secure the exposed layer of abrasive cutting particles until they become dulled beyond further use. Then they must break away to present a new layer of sharp grains. A stronger wheel would not break away and would be useless as a production tool. For certain critical grinding operations, such as tool grinding, the wheel structure must be relatively weak in order to wear away properly. This simple fact—that the wheel can never be stronger than the grinding operation demands—places a responsibility for careful use of the wheel on the grinder operator and his employer.

Inspection

The manufacturer speed tests the finished wheel, marks it with the maximum operating speed, packs it carefully and sends it to the user. The first safety step is inspection of the shipment. Are the grinding wheels labelled with the proper operating speed? Are there any visible cracks or other damage in transport? Are there any invisible cracks or defects? The way to detect these last is to hang the wheel loose and tap it with a non-metallic implement such as a wooden screw-driver handle. A sound wheel will give a clear mechanical pitch.

Storage

The first requirement of storage space for grinding wheels is dryness. Wheels should be stored in racks which may be wood or metal. However, the abrasive wheels themselves should rest only on wood; therefore, metal racks should have wooden blocks on the shelves to keep the wheels from touching metal. Wheel specifications should be plainly marked on the rack and the rack should be sub-divided to minimize wheel handling when selecting wheels for use. Organic wheels should be stacked on a flat surface to prevent warpage. Most other

straight wheels can be stored upright. If good storage facilities are not available, it is usually best to leave the wheels in the original shipping container.

The most important step in the safe use of grinding wheels is mounting the grinding wheel on the grinder. Thirty-five percent of wheel failures can be directly traced to improper mounting which produces high internal strains in the wheel. This is the largest single cause of failure.

Before mounting the wheel it is essential that the machine itself be checked for several safety factors. It must provide a solid base for the grinding operation; in the cases of larger grinding wheels it should be bolted to the floor. The arbor or pilot must be correct in size within close limits to allow the wheel to slip over without excessive clearance or "play" and without forcing or "wringing." The weak zone in a rotating wheel is the hole, so that mounting stresses must be applied as far away as possible from it.

Extreme care must be used with equipment and mounting procedures when wheels with large holes are used. All conditions of wheel strength must be carefully watched to prevent dangerous stresses from accumulating at the hole. To prevent warping or uneven wearing of equipment the minimum torque necessary for tightening the mounting screws should be known and followed.

Flanges must be at least one-third the diameter of the grinding wheel and should be designed with proper thickness and fit. Flange design and condition is important. If the flanges are not exactly the same diameter and do not apply pressure uniformly on the wheel, dangerous cross-bending strains are set up. Resilient washers or blotters under suitable flanges will distribute the pressure safely.

As final precautions before mounting, the exact speed of the machine's spindle should be known and checked against the maximum authorized speed of the wheel. This is particularly important when variable speed grinders are used or when changing wheels to different bonds or softer grades which may be much weaker. The new wheel should again be examined for cracks or signs that it may have suffered from handling, and the operator should examine the mounting spindle and flanges to be sure that they are clean and not nicked or damaged.

Guarding

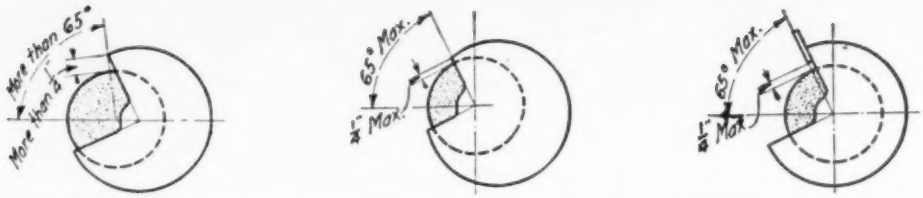
All grinding operations should be fully guarded to protect the operator from accidental breakage. This requirement must be enforced particularly on portable wheel grinders. A major portion of the personal injury accidents occur from breakages of these grinders when used abusively without guards. All guards are designed to contain the wheel even when it breaks. Different size openings for differing types of work are available. In each case the maximum size opening for the particular type of work is established in the safety code of the American Standards Association.

After the wheel is mounted and the guard adjusted the operator

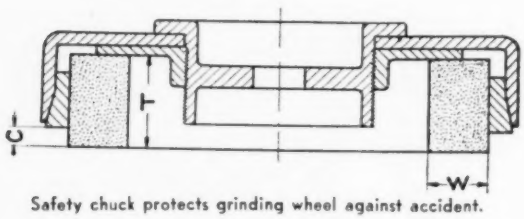
GRINDING WHEELS—

CHECK THESE:

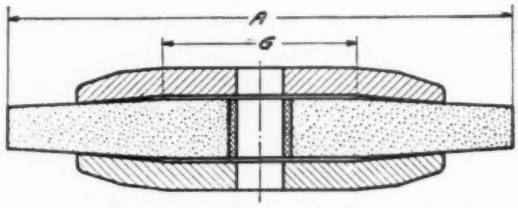
- Inspection ✓
- Storage ✓
- Mounting ✓
- Guards ✓
- Procedure ✓



Drawings at right and center show hoods giving required protection. In figure at right adjustable tongue gives required protection for all sizes of wheels used. In center figure movable hood has opening small enough to protect smallest size wheel used. Opening in figure at left exposes wheel dangerously since the opening is more than 65 degrees.



Safety chuck protects grinding wheel against accident.



Safety flange holds abrasive wheel firmly and safely.

should stand out of the line of the newly mounted wheel and start the machine, allowing it to operate a full minute before approaching the wheel. Breakages resulting from damaged wheels, mounting abuses, or over-speed usually occur immediately after starting for the first time. Once the wheel has been given this test the operator who follows the normal rules of safe operating procedure—feeding moderately; avoiding excessive side pressure, heating or loading of the wheel face; and keeping the guard in place when running the grinder—will have a perfectly safe operation. Rare accidental breakages will not endanger him.

Every plant using grinding wheels should have a key man or group who knows the requirements for safe grinding as established by the American Standards Association. He should also have available and know the literature of the Grinding Wheel Institute. Every foreman and operator should be familiarized with the safety code and required to observe it. Even accidental breakage that does no damage should be investigated to determine the cause and prevent a serious breakage later. In this way each grinding wheel operation will be as safe as the occupation as a whole.

Based on a speech delivered at the 40th National Safety Congress before the Glass and Ceramics Section.

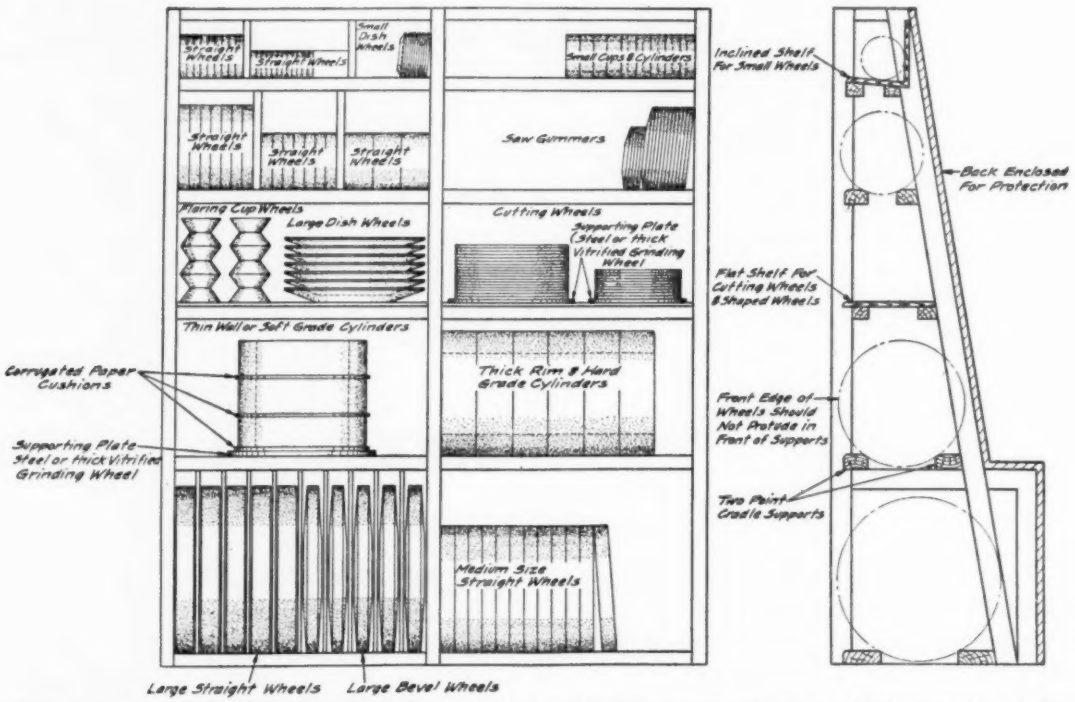

Straight Wheels
Straight Wheels
Small Dish Wheels
Small Cups & Cylinders
Straight Wheels
Straight Wheels
Straight Wheels
Saw Gummers
Flaring Cup Wheels
Large Dish Wheels
Cutting Wheels
Supporting Plate (Steel or thick Vitrified Grinding Wheel
Thin Wall or Soft Grade Cylinders
Corrugated Paper Cushions
Thick Rim & Hard Grade Cylinders
Supporting Plate Steel or thick Vitrified Grinding Wheel
Medium Size Straight Wheels
Large Straight Wheels
Large Bevel Wheels
Inclined Shelf For Small Wheels
Back Enclosed For Protection
Flat Shelf For Cutting Wheels & Shaped Wheels
Front Edge of Wheels Should Not Protude in Front of Supports
Two Point Cradle Supports

Diagram shows rack for storing various kinds of grinding wheels. The different way of storing each kind of wheel is clearly evident. Note different types of shelving, back enclosed for protection, and wooden supports to protect wheels.

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Safety and

By GEORGE W. HARPER
Assoc. Prof. of Mech. Engineering
University of Illinois,
Champaign, Illinois

THE problem of handling materials safely, that is, protection of the product, contains, basically, the same factors needed to protect the individuals who do the handling.

An "accident" is an unplanned, unpremeditated, unexpected, and unlooked for occurrence usually happening suddenly and sometimes resulting in injury. We know that accidents cause injuries, but not all accidents do so. In fact, one expert in the field has stated that the ratio is roughly 10 to 1, that is ten accidents to one injury. If we are ever going to stop injuries, stop the people in plants from being hurt, we must do it by eliminating the accidents that cause these injuries.

When we raise our sights to the problem of preventing accidents of any kind, and begin to do an honest-to-goodness job 90 percent of our effort is directed at protection of the product, materials, equipment and machinery. This effort and this program, when conceived, applied and directed will automatically take care of, and eliminate the injuries, with the resulting pain, suffering and economic loss to the individual.

Now the concept of attacking all accidents needs greater emphasis than it is being given in many industries today. Part of this emphasis will come through the realization by plant managements that an accident prevention program can make a vital contribution to operating efficiency and cost reduction. If a job is set up and engineered correctly for efficiency, it will be right from the accident prevention standpoint. The converse of this is true, also; any changes made to prevent accidents will improve efficiency. Perhaps some, from past experience, will disagree with this statement. In certain instances, it has been my experience too; but, when the specific case has been given thorough analysis, it was found that the best solution was not adopted. There are many times when, following a severe injury, snap judgments are made. Safe operation and efficient operation are one and the same where sufficient thought and effort are applied to the problem.

Highest Source of Injuries

Certainly, the cost of injuries make up a considerable part of materials handling and packaging costs. One-fourth of all compensated injuries, and one-fifth of all compensated permanent disabilities are caused by materials handling accidents. This makes it the leading source of industrial injuries. For this reason alone, the elimination of materials handling injuries is highly important.

This is only part of the picture. While it is impossible to compile a true and complete record of accidents, this picture is much greater and more costly than that of injuries alone. There are many reasons for our inability to get the whole picture regarding accidents. If an employee dumps a box of parts, or drops a lift of materials, he is the last person in the world to report it to the supervisor. He is not going to "stick his neck out." If the serious damage to parts, products or equipment is apt to reflect on the department, the supervisor, himself, does not rush instantly to the superintendent to report the accident. Yet many of these things happen from day to day. They must be brought to light and the proper steps taken to eliminate them, before they become sources of injury. Moreover, the cost of the loss in down time, in repairs, and in many other ways can exceed the costs piled up by the injury cases. While these may be hidden costs, they are nonetheless real in their impact on the overall plant efficiency.

An article, published last year, listing a number of case studies brought out 2 direct benefits of increased use of materials handling equipment: speeded up production and elimination of manpower and man hours. In addition there were many secondary benefits such as: reduction in heavy physical work,

Materials Handling

elimination of monotonous hand to hand handling, reduced worker fatigue, reduced heavy lifting and reduced accident hazards.

Six out of seven of these benefits are directed toward the elimination of accidents, and the reduction in potential injuries. Certainly this study alone would indicate that engineered materials handling can make a real contribution to the elimination of accidents and injuries in today's industry.

Meager Material

There is a meager amount of information now existing on the subject of accident prevention in materials handling. Perhaps there is one answer to this. The accident factors, and accident phase of this problem, are part and parcel of the whole picture. It goes almost without saying that substituting equipment for manual handling eliminates a great many accidents and injuries by removing their cause. Back strains, hernias, and excessive fatigue become things of the past under improved conditions. It must be mentioned that while these types of injuries are eliminated, a whole new series are brought into the plant. And, if great care and foresight are not used, the severity of the injuries sustained may be much greater. While this is a real problem it is one which cannot be covered by broad generalities. Each specific case must be considered and engineered in light of the existing conditions.

One of the authorities in the field of materials handling states: "What we are doing manually is only one-hundredth of one percent of maximum optimum efficiency." We have gone a long way to wring the lost motion and inefficiencies out of our production processes, but we have only begun to scratch the surface of the potential savings that can come through better materials handling.

In an article on this subject one author states that about 40 percent of all plant accidents involve materials handling. While the designers and manufacturers of equipment take every precaution to put mechanical safety into the equipment, it is impossible for them to anticipate the hazards that arise as a result of the application of the equipment.

Three factors must be considered: Safety from the standpoint of the equipment itself, safety of the operators using the equipment and safety of third parties, who might come in contact with it. Each of these three points must be taken into consideration if accident prevention becomes an integral part of the operation. In addition, the careful consideration of space requirements in which to utilize materials handling equipment efficiently is of prime importance. This is an important factor, which is often slighted, particularly in older plants.

3 Final Thoughts

Three thoughts seem to be of central importance in the prevention of accidents and injuries.

First, we will stop injuries only when we begin to do a thorough job on all accidents. Second, efficiency and lower costs are the basic reasons for an accident prevention program. Materials handling makes an important contribution to all three. Third, in considering materials handling equipment we must bear in mind three factors; the equipment itself and its space requirements, the employee who operates it, and the other employees who may be in contact with the equipment or work near it.

From a talk delivered before the Packaging and Materials Handling "Short Course" at the Chicago Coliseum.

For detailed description of materials handling equipment, see pages 438–454 of "Best's Safety & Maintenance Directory"—1952–53 edition.

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(Use Key # J-16 on Inquiry Card on page 81)

Wise Owl (Cont'd from page 13)

The astonishing growth of the club is proof enough of its effectiveness in combatting needless industrial eye injuries. From the original 14 members that were brought into the club at Joe Folks' suggestion, membership has grown to more than 4,400 in 761 plants with a total labor roll of more than 1,000,000 employees; Wise Owl chapters have been organized in every state of the union, Canada and Hawaii.

More than 5,405 eyes have been saved through the efforts of the Club, representing a financial savings in compensation alone of more than $18,000,000, based on a conservative average award of $3,500 per lost eye. ACF, for example, in four years after the founding of the club, saved close to $400,000 in compensation. This, of course, is in addition to preventing manpower losses totaling millions of work hours. And the saving in human suffering and economic hardship for workers and their families can never be estimated.

Potent Safety Incentive

"The Wise Owl Club," says Dr. Leonard Greenburg, New York City's Air Pollution Commissioner, "is undoubtedly the most potent eye safety incentive ever to appear on the industrial safety scene." Chairman of industrial advisory committee of the National Society for the Prevention of Blindness, Dr. Greenburg was formerly director of industrial hygiene and safety standards for the New York State Department of Labor.

Companies in just about every known classification are now making enthusiastic use of the Wise Owl Club, and employee groups as well as management have done much to cause its rapid growth. George Meany, president of the AFL, endorsed the Wise Owl Club, praising it as "a vital program in the field of industrial safety." Walter Reuther, CIO president, recently stated that "The Congress of Industrial Organizations endorses the Wise Owl movement, and refers it to the favorable attention of all American workers."

The Wise Owl Club's ever-fresh appeal, on all levels, is stressed by J. E. Nichols, safety director of the Reynolds Metals Company. "The use of the Wise Owl Club has now become an integral part of the general safety program of our company," Mr. Nichols says. "Industrial safety work thrives on appeals to the individual worker, and much of this activity needs a continually fresh approach . . . the Wise Owl Club, as a means of creating interest in safety, never seems to lose its appeal to the individual, and I think much of its value lies in this unique quality."

One of the interesting features of the Club's popularity is its rapid development in Canada. A short time ago the Accident Prevention Associations of Canada voluntarily offered to promote the club; they have already enrolled more than 500 Canadian Wise Owl members from over 80 companies.

Financial Savings Emphasized

James E. O'Neil, Director of Industrial Service for the National Society for the Prevention of Blindness, points out that in addition to savings in compensation costs and production, the Wise Owl Club offers useful public relations advantages. "Many companies, through concerted public relations efforts, have managed to impress upon local communities the company's concern for the safety and good sight of its workers. . . . News and pictures of Wise Owl awards in local newspapers will, in a tight labor market, help to attract prospective employees because they have been made aware that the John Doe Company is a good place to work."

Mr. O'Neil points out that with the Wise Owl Club program, employees who formerly had the impression that they had just "broken their goggles," now can be made to realize what they have really done is to "save their vision." In fact, many of the companies using the Wise Owl Club have stopped referring to "goggles." Instead they stress eye protection and report that, since this

change in safety phraseology, employees more readily grasp the seriousness of having their eyes injured or destroyed.

In some states there are movements under way to organize the Wise Owl Club chapters and members into a statewide club or organization to meet once or twice annually for combined social and safety activities. A recent dinner meeting in Connecticut, for example, was attended by management, labor and employee groups. Those present carried news of the meeting back to their plants, thus renewing interest in vision conservation in their own shops. Stories of the meeting were carried in many publications and newspapers, and the local television station used photos of the event. Heightened Wise Owl activity was a direct result.

Like most really effective plans, the organization and operation of a Wise Owl Club chapter is simplicity itself. Any firm interested in safeguarding sight and increasing safety-mindedness among its employees is eligible to enroll. Employees who have had one or both eyes saved by wearing eye protection at the time of an accident are eligible for charter membership, and new members enroll as they qualify. A chapter may be formed, however, before any members are eligible. On receipt of each verified case report from a plant, the National Society for the Prevention of Blindness furnishes a gold Wise Owl pin, a shop badge and a certificate. Special presentation ceremonies afford a good opportunity to publicize the company's safety program both in and out of the plants. Each Wise Owl pin wearer becomes a successful advertisement for the plant safety program.

"One out of every five industrial accidents is an eye injury," Mr. O'Neil points out. "That means about 300,000 tragic, expensive eye accidents annually. The Wise Owl Club of America has proved to be our most effective weapon in the continuing campaign to protect the vision of America's working men and women, and to cut down needless financial loss for all concerned."

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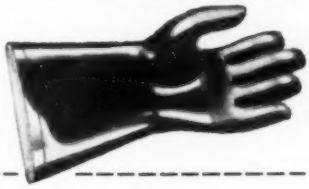

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World's largest maker of coated industrial gloves

Edmont.

Edmont job-fitted gloves

(For further details, use Key # J-17 on free Inquiry Card on page 81)

TRANSPORTATION SAFETY

"Driver of the Year" Saves 3 Lives

A 35-year-old professional truck driver, who has risked his life to save motorists injured in highway crashes, has been named the "Driver of the Year" for 1953.

He is Cullen H. Newsome of Winston-Salem, North Carolina who drives a tractor semi-trailer unit nearly 8 thousand miles monthly for McLean Trucking Company on the run from Winston-Salem to Boston, Mass. He joined the company last fall after completing professional truck driver training. He had 210 thousand miles and 5 years of safe driving prior to joining the company.

The three-man panel of judges—Chairman, Col. W. B. Lentz, Commanding Officer of the North Carolina State Highway Patrol; H. S. Baucom, Safety Director for the North Carolina Industrial Commission and M. B. Glover, Director of Motor Freight Transportation for the North Carolina Utilities Commission—agreed on Newsome as their unanimous choice. Six other professional truck driver finalists were given honorable mention. It was noted that Mr. Newsome's yearly driving mileage of 96 thousand miles is equivalent to nearly 10 years of driving by the average passenger car driver, the passenger average being approximately 10 thousand miles yearly.

The judges, in selecting Mr. Newsome, emphasized their choice had been dictated by his extreme heroism in saving the life of a young woman who had been thrown 25 feet into a stream after her car had plunged down a 60 foot embankment. Mr. Newsome, first to arrive at the scene, found the woman submerged face down in the stream and unconscious. He rescued her from the water and immediately administered artificial respiration, continuing for more than 20 minutes until the accident victim began to breathe freely. At the same time he was instrumental in directing others and giving assistance, completely taking control until the highway patrol arrived at the scene. One month later, Mr. Newsome was driving his truck when he suddenly observed a woman standing in the highway, waving frantically. Stopping immediately, he saw a smoking wrecked car, and used his truck fire extinguisher to put out the fire. With the help of arriving state highway patrolmen, he pried open the car door and released 2 people who had been trapped in the car. Mr. Newsome used blankets from the truck to cover 2 other accident victims, in serious condition, awaiting arrival of an ambulance.

Brakes Need Attention in 1 out of 6 Cars

THE result of 4 weeks of 'Safety-Checks' of vehicle condition has revealed that 1 vehicle of every 6 checked has brakes in poor to dangerous condition," according to W. F. Hufstader, Chairman of the Inter-Industry Highway Safety Committee, and Vice President of General Motors.

"The condition of brakes this year," Mr. Hufstader adds, "is far worse than reported in any previous 'Safety-Check' program. Brakes that are not maintained in safe operating condition are a threat to drivers and pedestrians alike."

He points out that although the over-all condition of vehicles is slightly better than the 1952 "Safety-Check" report 1 out of every 4 vehicles checked was in need of maintenance attention to one or more parts affecting safe operation.

"With more than 53 million vehicles crowding inadequate streets and highways, and traffic accidents and deaths running ahead of last year," he continues, "every driver must assume individual responsibility to maintain his vehicle in safe operating condition at all times."

The "Safety-Check" program was conducted during the month of May by the Inter-Industry Highway Safety Committee, in cooperation with the National Safety Council. Results were obtained on the basis of "Safety-Checks" made by 1,755 automobile, truck and tire dealers in all states, the District of Columbia, and Hawaii. Ten items affecting safe vehicle operation were included in the spot check of 423,533 vehicles.

Heading the list of 10 items checked and needing maintenance attention for safe vehicle operation were: brakes—1 out of 6; front lights—1 out of 11; rear lights—1 out of 13; steering—1 out of 13, and exhaust system—1 out of 14.

Accident Controls for Post Office Vehicles

A MOTOR vehicle accident claims and safety committee of the Post Office Department has been established to apply modern fleet management accident prevention controls to postal fleet operations and to improve accident investigation and claims procedures.

The Safety Director of the Post Office Department, Mr. Edward B. Landry, will chairman the committee. The committee is authorized through its chairman to obtain assistance from any group, organization,

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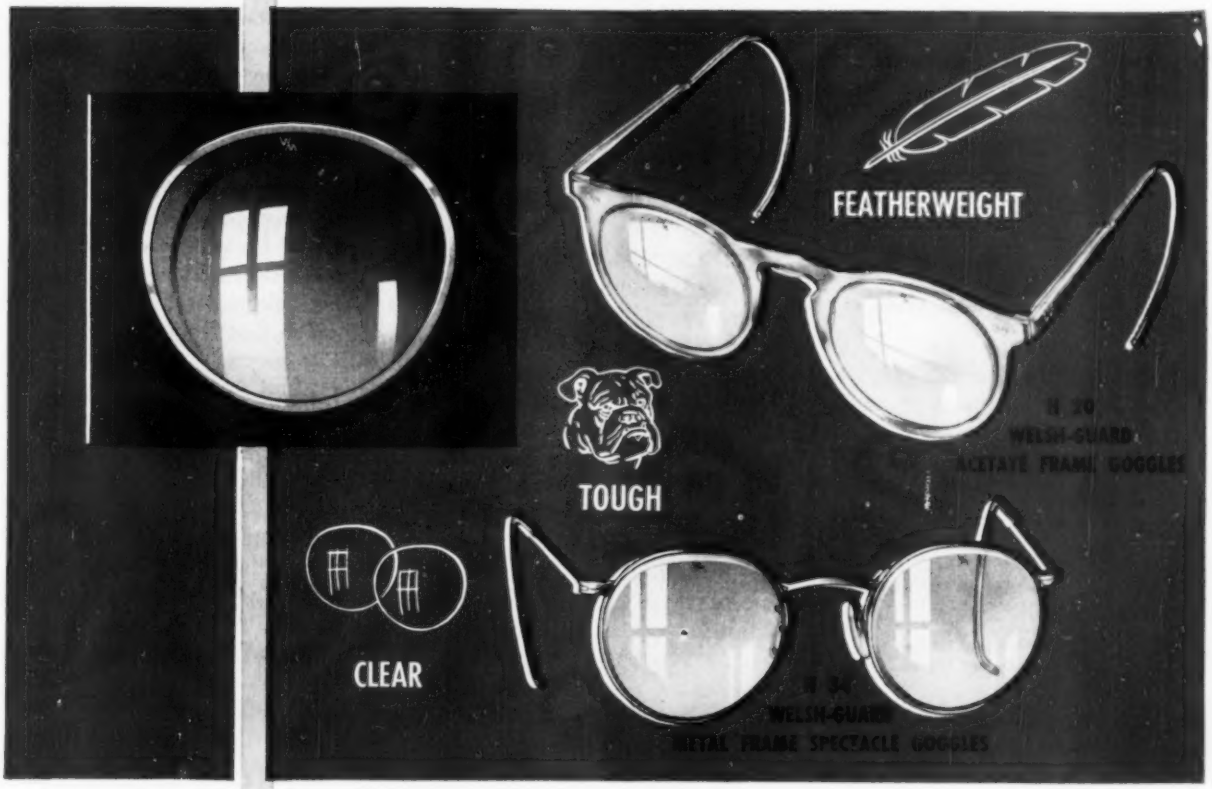

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(Use Key # J-19 on Inquiry Card on page 81)

or individual whose knowledge, information and experience will be helpful to the committee in the performance of its task. Such consultative services are to be gratuitous unless otherwise authorized. The committee's report will be transmitted to the office of Deputy Postmaster General C. R. Hook, Jr. for action. Secretary of Labor Durkin has endorsed the program and offered the services of the Labor Department Committee for operators of federal vehicles.

Cars Travel Too Fast For Drivers And Roads

MILLIONS of motorists have been conditioned to a "false feeling of perfect safety at high speeds as a result of the horsepower race indulged in by automobile manufacturers and by oil companies through super-fuel advertising," the Detroit Chapter of the Automotive Booster Club heard from Thomas N. Boate, accident prevention department manager of the Association of Casualty and Surety Companies. Mr. Boate appealed to both industries to "deemphasize speed because it has cost thousands of lives already and will certainly cause many more highway deaths unless drivers learn that super-speeds and perfect safety are incompatible."

He urged the automobile industry against "being influenced to any deadlier increases in horsepower by the competition of foreign cars which are being blatantly advertised with speeds of 80 to 150 miles an hour." Such super-speeds, he asserted, "are as insane as they are unsafe on public highways, and should be fought as contrary to public policy and public safety."

A speed of 50 miles an hour is all that an average driver can safely handle, even on the most modern highway under the best of conditions, according to Mr. Boate. Higher speeds are "too much of a gamble with personal safety. This condition is growing more dangerous for public safety, as accident records continue to prove," he declares. Because excessive speeds are causing up to 50 percent of highway fatalities and about one-third of the injures, he advocates speed limits scaled down to 50 miles an hour and zoned even lower to fit adverse weather, traffic, or highway conditions.

In addition to de-emphasizing speed and power, he says, the motor industry could make "its second most important contribution to greater highway safety" by helping to spread periodic motor vehicle inspection to all states. In the 25 years since the first state inspection law was adopted in Pennsylvania, 14 states, the District of Columbia and 11 cities have put this requirement into effect. Up to 50 percent of the vehicles on the road have been found to have defects in mechanisms or equipment that could cause accidents, he asserts.

New Jersey Record

Mr. Boate emphasizes the record of New Jersey in accident prevention through regular inspection of vehicles. Deaths averaged 1,200 annually in the 10-year period prior to adoption of New Jersey's inspection program in 1938, then dropped 32 percent from 1,278 fatalities in 1937 to 865 the year inspection went into effect. Since then New Jersey motor vehicle fatalities have never yet even approached the pre-inspection period totals, despite the fact that both vehicles and licensed drivers now are nearly double the 1938 totals. He further points out that a recent state-wide poll has shown that New Jersey voters overwhelmingly approve of the way the state's vehicle inspecton system operates.

In citing the need for spreading the requirement of inspection to all states, Mr. Boate says the average age of both cars and trucks is between 6 and 7 years. Approximately 13,500,000 passenger cars, or more than one-third of the total, and about 2,650,000 trucks, comprising more than one-fourth of those on the road, were manufactured before World War II.

"Pennsylvania removes about 150,000 vehicles per year from the highways due to unsafe condition found in inspections. In New Jersey, about 200,000 vehicles fail to pass inspection each year. And in a single month in the District of Columbia over 200 vehicles are towed away from inspection stations because of faulty brakes alone.

Safe steering equipment becomes of vital importance in high speed travel, but New Jersey regularly finds over a quarter of a million steering equipment deficiencies which are rejected until the unsafe condition is corrected.

The accident prevention value of a sound periodic motor vehicle inspection program is evidenced by the Pennsylvania experience. Defective equipment in that state normally accounts for less than 4 percent of the fatal accidents, as compared with some states where reports indicate that defective vehicles are involed in as many as 19 percent of the fatal accidents.

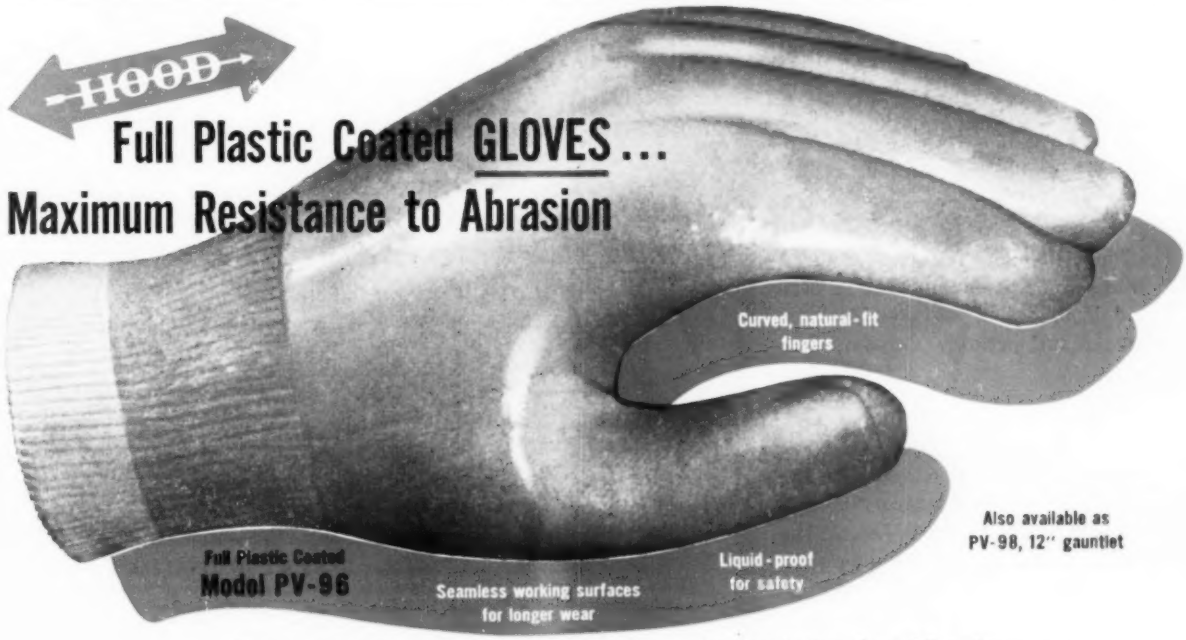
Oil Transport Adopts Twin Braking System

MANY of the nation's petroleum companies and trucking firms which haul highly flammable liquids over the highways are making a change-over to 2 independent braking systems on their tractor and tank-trailer units, according to George G. McManis, automotive division manager of the Warner Electric Brake & Clutch Company.

The trend toward 2 braking systems—air or hydraulic on the tractor and electric on the trailer—has been given emphasis by the present highway safety programs being carried on by major oil companies. Twin braking systems should substantially reduce the number of brake accidents involving tank trailers because: (1) the 2 systems provide double safety, should one fail to operate; and (2) the danger of jack-knifing is almost eliminated, since the brakes on the trailer can be positively synchronized with those on the tractor.

Mr. McManis says that 2 recent significant applications of the twin brake systems are tank trains including a semi-trailer and 4-wheel "pup" trailer (a small trailer hauled behind a semi-tank trailer) and a standard tank truck with a 4-wheel trailer. The electric brakes are particularly adaptable on these units because of the overall length involved, which causes a problem of "time lag," both on brake application and release. The instantaneous action of the electric system reduces this "time lag" to a minimum.

The synchronization of brakes made possible by the twin system makes shorter stops possible and insures that each brake in the unit does its share of the work. "This reduces the danger of brakes fading out and cuts maintenance costs considerably," he continues, pointing out that the independent braking system is already in widespread use on other types of commercial trailers.



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Hood makes a complete line of industrial rubber and plastic gloves that will help keep your safety standards high. Write today for our new illustrated catalog featuring the Hood Glove Guide, which shows you "how to choose the RIGHT Glove for EACH job".

HOOD RUBBER CO., Watertown, Mass.

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Railroad Employee Is 3 Times Safer On Job

RAILROAD safety progress has made employees 3 times safer on the job than off. For every 10 men injured at work before the advent of organized safety programs 9 now avoid injury, according to J. T. Williams, Pennsylvania Railroad manager of safety. Mr. Williams told the Purchases and Stores Division of the Association of American Railroads that many employee units on the Pennsylvania work a million man-hours without a reportable injury. Only recently, he said, an entire shop-department of over 100 men in Altoona, Pa., completed 10 years without an injury resulting in loss of time!

Railroad rule books of a century ago had in their opening sentence references to safety. "There has been constant improvement down through the years and last year not one passenger was killed in a train accident on the railroads of America. A passenger is safer on the train than he is in his own home," Mr. Williams continued.

He pointed out that suppliers of railroad equipment have "brought about technological advances of untold benefit to safety" by helping to develop stronger and more reliable track and bridges, advances in design and construction of cars and locomotives, and in signalling systems and methods of communication.

Safety Training

A company's approach to employee safety should be inspirational rather than instructional, or "preaching," according to Mr. Williams. He said motion pictures are used widely to combine safety lessons with an "emotional and entertainment appeal" that has been found to be most effective in making lasting impressions.

There is still ample opportunity in the field of accident prevention. "Thirty-seven thousand deaths occur on our highways each year, and 55,000 more from other needless causes. Every time we breathe, each time we inhale, an American is injured by accident, and every time we exhale another American is injured by accident.

"On the railroads we plan for safety and forestall many accidents. We plan with as much foresight as we possess but when, because of human limitations, that fails or is inadequate we salvage the benefits of experience for further design for safety. It staggers the imagination to think of the improvement total safety could bring," Mr. Williams concluded.

Police Must Be Safe Drivers, Too

"PRACTICE what you preach in traffic safety," the president of the International Association of Chiefs of Police recently told members, urging them to participate in a nation-wide vehicle fleet safety contest.

"We have no right to expect others to be safe drivers unless we insist upon careful handling of police vehicles," said Cyrille Leblanc, Gardner, Mass., president of the IACP.

"One of the best ways to promote safety in police fleets is by actively participating in the National Fleet Safety Contest," he added. Two special police divisions were recently established in the fleet safety contest—one for municipal police departments and one for state police and highway patrol organizations.

Although the current contest began July 1, there is still time for police fleets to enroll. Police administrators may obtain contest rules, registration forms, and report forms by writing the Motor Transportation Division, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. Contestants compete without charge and, under the rules, report the number of reportable accidents sustained and vehicle miles traveled during each month. Each contestant receives a monthly bulletin showing his cumulative accident frequency and his standing in the contest. Police departments are mentioned in the bulletin by code number only. The contest, now in its 22nd year, includes more than 1,300 truck, bus, and taxicab fleets.

The Technique of Passing Safely

TRUCK driver passing techniques have been issued by the North Carolina Motor Carriers As-

(Continued on page 38)

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FOR SEPTEMBER, 1953

men over 45

More than six times as many men of your age will die of lung cancer this year as died in 1933, according to official reports. Though our research scientists are making every effort to discover the reason for this increase, they still don't know the answer.

They *do* know, however, that the lives of over half of those who will develop lung cancer *can* be saved . . . if they get proper treatment while the disease is still in the silent stage, before any symptoms have appeared.

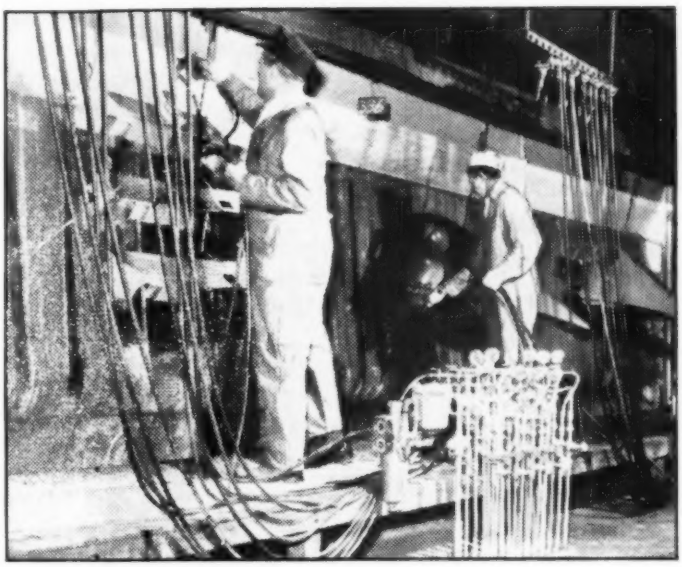
That is why we urge you to have a chest X-ray every six months when you have your regular health check-up . . . no matter how well you may *feel*. Since only an X-ray can detect the "silent shadow" in its earliest stages, it is your best insurance against death from lung cancer.

For more detailed information about this or any other form of cancer, call our nearest office or simply address your letter to "Cancer" in care of your local Post Office.

American Cancer Society

Only 1 in 100 . . .

employees in the automotive industry was injured in 1952. Here's how hazards were kept under control . . .



MORE than 99 percent of all United States automotive plant employees worked throughout 1952 without a reportable job-injury. On the other hand, according to National Safety Council statistics, about 2.8 percent of all Americans, or one in 36, are injured annually in home accidents.

The average automotive plant worker, in other words, has less chance of being hurt on the job than during leisure hours in his own kitchen, basement or backyard.

The present high level of safety in the automotive industry is not a matter of chance. If it were, factories would undoubtedly be very dangerous places since they are full of heavy machinery, moving conveyors, high voltage electrical equipment and other potential hazards. Available data for 1952 indicates that it was the best year in the industry's history from an accident point of view. One company established a new industry record of 1.4 lost-time accidents per million man-hours worked. Individual plants in the company bettered this mark. Another company posted a 1952 accident rate of 2.02, its lowest on record. The average accident frequency rate of all United States industry in 1951 was 9.06. For the same year, the comparable rate of the automobile industry was 4.49.

The story of the progress in plant safety in the automotive industry is one of constant planning and improvement, not luck. Each year sees a bettering of the previous year's record. One large motor vehicle company, for example, recorded an accident frequency of 21.5 in 1929—about average for the time. Within 5 years, the firm had reduced the rate to 11; and, by 1940, to 3.43. Following the war, progress continued without interruption, forcing the rate steadily downward to less than half its pre-war low.

This kind of progress has been achieved by attacking the safety problem on many fronts, with the same kind of thoroughness that goes into solving a major engineering problem. Safety, in fact, has itself become a highly specialized field of engineering. Good safety engineering calls for careful advance planning and the foresight to safeguard against potential hazards before, rather than after, they happen. Safety planning begins in the first blueprints of a new factory or a new machine, and continues through every phase of manufacturing operations.

Technical Contribution

One of the important technical contributions to automotive plant safety in recent years has been the development of automation—the automatic, mechanical handling of materials on the production line. New electronically controlled mechanisms today are performing many potentially hazardous jobs that formerly had to be done by hand. Continuous advances also are being made in the design and layout of factory buildings, providing better lighting, good ventilation and heating, more effective fire protection,

and other improvements affecting safety. Machines and employees alike wear a variety of safety guards and devices, costing millions of dollars a year. Safety switches of many types protect workers by counteracting carelessness and forgetfulness. There are switches that require a machine operator to have his hands clear of the moving parts before the machine can function. Protective covers or guards also are strategically placed to keep employees' hands, feet or clothing out of harm's way.

Personal safety equipment is available to employees when needed, including such items as headgear, safety visors, goggles, aprons and coveralls, respirators, gloves and safety shoes. Abrasive flooring prevents slipping. Prominent signs mark dangers. Traffic lights, signs and even mirrors for seeing around corners, keep plant traffic flowing smoothly and safely. Aisleways are kept clear and clean. Dangerous fumes are vented, and combustibles or active chemicals properly safeguarded. Electric eye devices and other types of guards keep workers from injury in machine operation. Continuous flowing waterfalls catch excess spray from paint guns and wash it harmlessly away from painters.

Employees trained in first aid are prepared and equipped to meet any emergency. Many automotive companies maintain extensive medical facilities for employees, including completely staffed hospitals and clinics. Employees who become ill are also cared for in these facilities. Thorough medical check-ups are given all personnel, and complete records are maintained.

Teaching and selling safety to the employee is a vital part of the industry's effort to prevent accidents. Posters, slogans, and exhibits conveying safety messages are displayed prominently throughout all plants. Each new employee is indoctrinated in safety rules and issued safety literature. Plant publications stress safety themes. In some plants, foremen are required to spend a certain period each day talking over safety matters with employees. The foremen themselves receive safety information in periodic meetings and company bulletins.

Companies also use prize contests and competition to stimulate safety-mindedness, sometimes with startling results. In one case, a plant reduced its accident rate almost 100 percent in a year-long safety drive. One division of another firm organized a "Bank of Safety," which paid dividends in the form of meal credits at the plant cafeteria whenever a full month passed without an accident. The result was that the division worked more than 15 million consecutive man-hours without an accident—a record for the industry.

All this care and planning, invention and construction, and cooperation and teaching combines in the automotive industry's success in enabling 99 out of 100 employees to complete their work during 1952 without an on-the-job injury.

Passing (Cont'd from page 34)

sociation in an effort to halt the rise in fatalities caused by motorists driving on the wrong side of the road.

"Sixty percent of traffic fatalities last year were caused either by exceeding the speed limit or driving on the wrong side of the road," J. T. Outlaw, the association's executive vice-president, reminds drivers. "We in professional driving feel that many of these accidents could have been avoided had the drivers known the fundamentals of safe passing."

"There are 4 general requirements for a safe pass. They are:

1. Adequate sight distance. The faster you drive, the farther ahead you must see to pass safely.

2. Distance judgment. Over five average city blocks are needed to pass a vehicle moving at 40 miles per hour when you are doing 50.

3. Knowledge of what's behind you. Check the mirrors carefully to be sure no one is about to pass you.

4. A running start. Be sure you are proceeding at a much faster rate than the vehicle being overtaken and passed."

"Courtesy comes into passing," the trucking official concludes, "when someone wants to pass you, why not slow down and pull to the right? The other fellow has a right to pass."

MIT Offers Course In Materials Handling

THE Mechanical Engineering Department of the Massachusetts Institute of Technology will present the 1953 Industrial Packaging and Materials Handling technical short course educational program this October in Boston.

This has been announced by Stanley Price, national president of the Society of Industrial Packaging and Materials Handling Engineers, who will sponsor the course as part of the annual SIPMHE triple feature event of the packaging and materials handling world—the short course, the Industrial Packaging and Materials Handling Exposition, and the National Protective Packaging and Materials Handling Competition. The four-day short course will begin Monday, Oct. 19, while the exposition will open the following day in Mechanics' Hall.

Details and the program for the short course are already being arranged by Prof. C. R. Soderberg, head of the M.I.T. Department of Mechanical Engineering; Associate Prof. John E. Arnold, coordinator for M.I.T. with SIPMHE, and John W. Kraus of the Thompson Products Co., Cleveland, this year's SIPMHE chairman for the short course.

This is the first time that the event has been presented in the New England area. In view of this fact and the sponsorship by M.I.T., Price said, the 1953 short course registrations may exceed even last year's record, 746. Indications are that exhibit space will be sold out.

The highly specialized nature of the exposition focusses attention principally upon protective packaging and materials handling as related to packaging and shipping.

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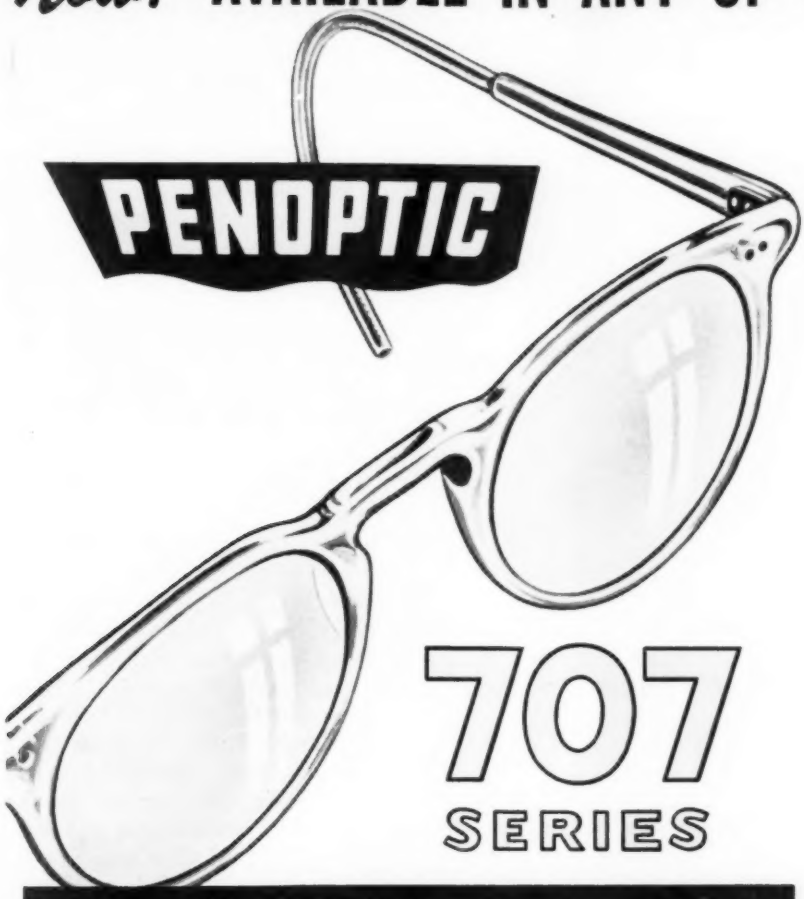

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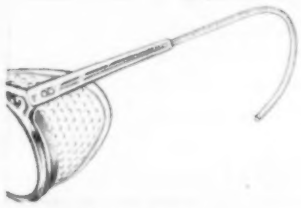
Wire core temples with cable wound ends.



MODEL 707S

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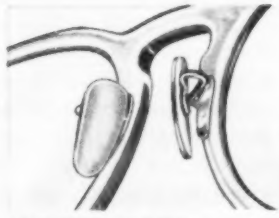
Spatula temples, wire reinforced.



MODEL 707R

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PENNSYLVANIA OPTICAL COMPANY

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(For further details, use Key # J-21 on free Inquiry Card on page 81)

NSC Reports 7% Drop In Accidents in '52

WORKERS employed by member companies of the National Safety Council had the safest year on record in 1952. They had fewer on-the-job accidents than ever before and the ones they had were less serious.

Industrial injury rates for last year, released by the council show a substantial reduction in both frequency and severity of 1952 accidents as compared with 1951. Thirty-one of the 40 basic industry classifications reduced their frequency rates, and 25 reduced severity rates.

The average accident frequency rate for employees in all industries submitting company reports to the council, based on the number of disabling injuries per million man-hours, was 8.40 in 1952—a reduction of 7 percent from the year before.

The communication industry again led all others by turning in the lowest employee frequency rate. Its rate was 1.61—a 10 percent reduction. Electrical equipment ranked second with 3.38, followed by the automobile industry with 3.62. Cement, third in 1951, dropped to sixth.

Severity Rates

Lumbering stayed at the bottom of the frequency list in 1952 with a 35.48 rate, but this represented an 18 per cent reduction. Underground coal mining remained in the next to last position with a 33.00 rate. The average accident severity rate for all industries reporting, based on the number of days lost per thousand man-hours, was .88 last year—a decrease of 9 percent from 1951.

Communications also had the lowest severity rate, leading all other industries with a rate of .10—an 11 percent increase from 1951. Wholesale and retail trade was second with .14 and tobacco ranked third with .23. Both aircraft manufacturing and the automobile industries had notable reductions in their severity rates, of 46 percent, moving up to sixth and seventh places respectively.

"SAFETY MAINTENANCE" Salutes a Safety Idea

Last Chance to Test For NEXT Summer

THERE is still time to profit from this summer's experience and have the answers to next summer's problems ready ahead of time. Hot, humid summer days take their toll in lowered production. Hot, sweaty workers find it hard to keep their minds on their job and off vacations and cooling daydreams. Their safety is endangered as well as their comfort by the heat, for they grow careless or thoughtless in the steamy, sticky weather that seems to envelop them.

What to do about it? Hundreds of things are suggested: air conditioning, rest periods, fans, salt tablets, cool drinks, sweatbands, etc. The conscientious safety engineer and plant manager have notes a mile long by the end of the summer. The trouble is they haven't had much time to test these ideas they've been jotting down. But it isn't too late. If the notes are simply put aside until the beginning of next summer, all the fine ideas for boosting production in summer will be barely into operation before the summer is over again.

The thing to do is to order test lots of the equipment that sounds as if it will solve a particular problem. In the next few weeks of hot weather these ideas can be tested. Use them in one department and check them against the output of others. Or, check one group of workers against another. With the results obtained full orders can be sent early in the spring before the seasonal rush for hot weather supplies begins.

For example, lots of sweatbands can be ordered and tested now. The safety hazard when the employee has sweat dripping in his eyes, making vision foggy or temporarily blinding him, is generally recognized. Tests show that the employee who stops to wipe his brow loses from 2 to 5 seconds time. Multiplied many times during the day and by the number of workers, this represents quite a loss of time and money. Sweatbands of cellulose sponge, moistened in water before use, cool the worker's brow. Perspiration evaporates along with the water, cooling the entire body. It is said to be one of the cheapest and most effective ways to maintain production during hot months. It sounds like a good idea, but it has to be tested in individual plant applications.

Now is the time to test it. The few hot weeks remaining can give valuable test periods for all kinds of hot weather equipment for next summer.

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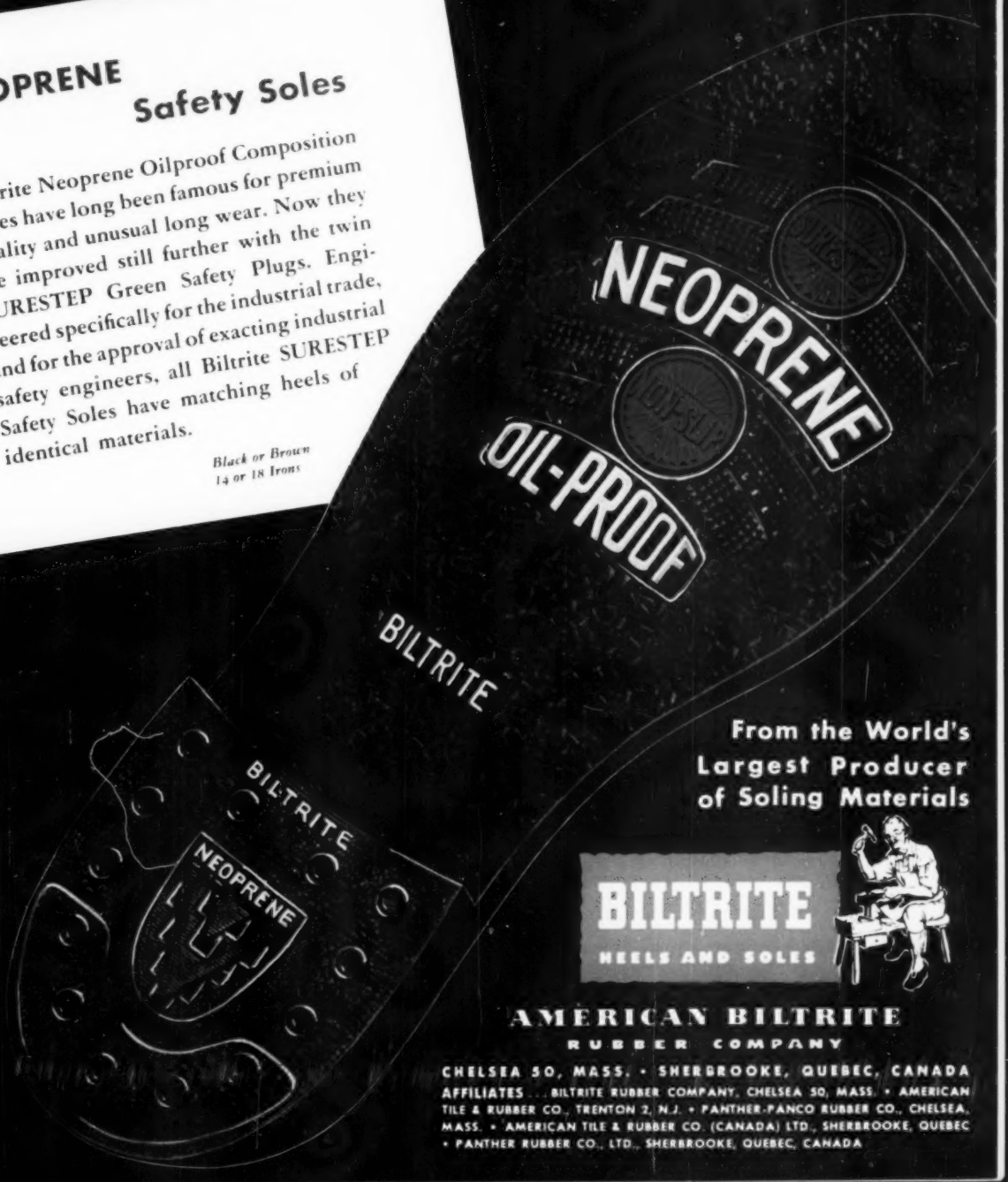

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Lockheed Aircraft Corporation recently conducted a person-to-person canvass that put a Payroll Savings Application Blank in the hands of every employee of Lockheed's eleven plants in Southern California. At the conclusion of this one-week campaign, 36,419 of the 38,037 employees—95.7%—had signed up on the Payroll Savings Plan. Three of the eleven plants achieved 100% enrollment.

Lockheed's 95.7% in the Southern California plants is the highest employee participation of any company or group of this size this year. The previous national record in the aviation industry—92%—was set by Lockheed's Georgia Division in April, 1953. Of Lockheed's total payroll—50,000 men and women—94.9% are building ". . . security—both individual and national" by systematic investment in U.S. Savings Bonds.

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SAFETY MAINTENANCE & PRODUCTION

SAFETY ACHIEVEMENTS

SEVENTY-FOUR factory employees of the Ebco Manufacturing Co., Columbus, Ohio, recently received safety awards for 5 or more years without a lost time accident. A. R. Benua, Ebco president made the presentations at a special plant ceremony. The gold, silver and bronze medals are a miniature replica of the company's trade mark.

Eleven employees received gold emblems for 15 or more years without a lost time accident. Ten employees received the silver 10-year safety emblems. Fifty-three Ebco workers were awarded the bronze 5-year safety emblems.

THE National Safety Council's Award of Honor has been presented to the Borden Company's Wheeler Cheese Division in Green Bay, Wis. The award, highest given by the Council, was made in recognition of the plant's completion of more than 1 million man-hours of work without a lost-time accident.

According to Safety Council files the record of the Wheeler plant is the best ever compiled by a Wisconsin cheese plant. The plant has been without a lost time accident for more than three years. Individual key chains were given to Wheeler employees in recognition of their safety record.

ALL employees at the Brandon, Miss., plant of Marquette Cement Manufacturing Co. have been honored for their outstanding record in industrial safety. There has been not a single lost-time injury to any man working in the plant or quarry there since operations began in 1951.

In recognition of this, and specifically for a perfect safety record in 1952, the plant has been awarded the safety trophy of the Portland Cement Association.

STANLEY F. SPENCE, Safety Director of American Cyanamid Company, announces that the Winchester, Massachusetts, Laboratory received the firm's Award of Merit for operating 341,460 man-hours without a disabling accident. This record was made from May 1, 1951 to June 1, 1953.

THE Du Pont Company's Old Hickory, Tenn., rayon plant has set a remarkable record in industrial safety. It recently completed a total of 28,160,000 man-hours without a lost-time injury and the employees are still adding to the total.

Four years without a time-losing injury, the plant established a new world's safety record for the second time in its history. The plant's first mark was set in 1937 when it completed over 11,000,000 exposure hours without a major injury.

Ned E. Dearborn, president of the National Safety Council, personally presented "an award of honor" to the plant in recognition of its record-breaking achievement. "This award," Mr. Dearborn said, "recognizes the greatest total of injury-free man-hours recorded for all industry."

THE National Safety Council's Award of Honor for good safety performance has been presented to the Bendix Radio Division of the Bendix Aviation Corporation.

The Award of Honor is given on the basis of the safety experience of a company relative to the national average of all companies within a particular industry. In 1952 Bendix had a frequency rate of 1.6 disabilities per million man-hours and a severity rate of .04 days lost per thousand man-hours.

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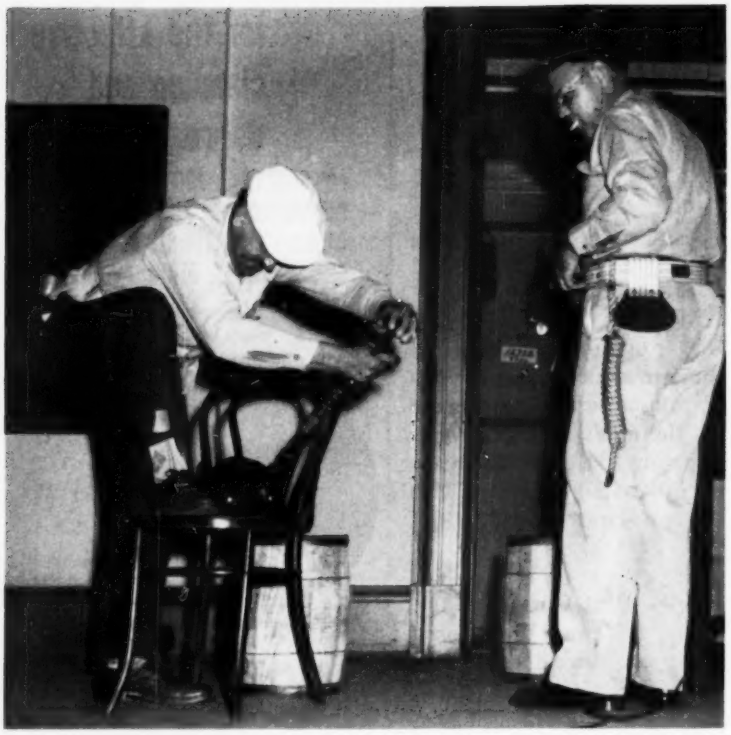

Scene from employee presentation of safety play shows confirmed skeptic and braggart O'Paterline, drilling holes in his safety hat just after receiving it from toolroom.

Employee Drama Explains Company's Safety Program

ONE of the features of the Western Pennsylvania Safety Engineering Conference held April 28–30th at the Hotel William Penn, Pittsburgh, Pa., was a play given by employees of Dravo Corporation under the direction of narrator John B. Kovach, safety supervisor of the Machinery Division.

According to Mr. Kovach, the play was the outcome of numerous requests from safety and management organizations to describe the Dravo safety program before interested groups. Rather than use the general lecture approach, company officials devised a true-to-life skit that presents the subject in a work-a-day manner. Based on the safety training program instituted to indoctrinate new employees with company policies, the scenes followed a typical group of new men through conferences with the job timekeeper, the safety coordinator, specific craft stewards, toolroom attendant and finally with the general foreman.

Despite the fact most of the employees on these jobs, being hired locally, have had, in many cases, very little previous safety training, the company has won several awards for its over-all low accident rate. An important factor in this record is management's attitude as expressed by Carl B. Jansen, president, which the safety coordinator quotes to new employees, "I hate accidents. If you hate them as much as I do, and we all really work to prevent them, we will put an end to them."

Reactions expressed by the actors were those transcribed from actual interviews with prospective employees. When the safety coordinator very carefully explained to several new men that the policy on all jobs is: First, safety; second, quality; and third, production; the colorful comments ranged from facetious to impertinent. Portrayed as it actually happens, the play presented a practical approach to safety training that has produced outstanding results in heavy construction.

Picture by courtesy of Dravo Corp.

Label the Hazard

CONTINUING its efforts to achieve uniformity of state warning label regulations for hazardous chemicals, the Manufacturing Chemists' Association has issued a newly revised edition of its Manual L-1: Warning Labels.

The manual was prepared originally by the association's committee on labels and precautionary information to provide standards of labeling for chemical manufacturers and is still the authoritative reference for this purpose. The association believes that essential precautionary information should reach every person using, handling, or storing chemicals, and that warning labels affixed to the containers offer the most practical means of doing this.

Used by States

With the increasing tendency of individual states to favor legislation controlling chemical labeling, however, the manual has taken on the additional important function of providing a sound basis on which to achieve uniformity in state requirements. Of the 5 states and territories which now have chemical labeling codes, 4—California, Illinois, Oregon and Hawaii—essentially follow the recommendations in the manual.

The new edition sets forth the principles of proper warning label preparation and includes illustrative labels for some 250 industrial and agricultural chemicals. It also covers labels for small packages and for samples and new products for investigational use.

Most of the suggested labels present information beyond that required by Federal statutes. They are intended for use in addition to or in combination with any labels required by law.

The Public Health Service has approved and endorsed the labeling principles set forth in the manual. Copies of the 98-page booklet are available from the Manufacturing Chemists' Association, Inc., 246 Woodward Building, Washington 5, D. C. for $1.00.

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Fatigue Cures For Industry

INDUSTRY is finding on-the-job cures for that too-tired feeling which sometimes comes at the end of a day's work, a Du Pont Company physiologist reports.

The story is told by Dr. Lucien Brouha of the company's Haskell Laboratory of Industrial Toxicology. He describes some of the basic research his company is doing to learn causes of fatigue and to develop ways of making jobs easier.

Years of research have established the fact that increases in an individual's pulse rate and temperature following muscular exertion and the time it takes these reactions to start back toward normal levels can be relied upon to measure the amount of physical stress caused by work and the fatigue it is apt to induce. Thus, says Dr. Brouha, it is possible for the physiologist, without cumbersome equipment, to evaluate and classify many industrial jobs according to fatigue potential.

This is what happens when the plant physiologist, with stop watch and clinical thermometer, starts to ferret out fatigue, and its causes, on a particular job:

Immediately following a work period, he records the pulse rate of workers at rest 3 times at 1-minute intervals. Thus he determines pulse increases caused by exertion and the rates at which the pulse returns towards "resting levels." Body temperatures also are measured during the same 4-minute rest period.

The procedure is repeated throughout the working shift. If the average rise in pulse and temperature is found to be progressive or if the recovery to the "resting level" is too slow at any time during the shift, the physician knows that something about job activity or working conditions is causing employees to draw too heavily upon physical reserves.

On some jobs, Dr. Brouha reports, fatigue has been reduced by lowering heat and humidity, by increasing ventilation and by evolving a schedule of rest periods adequately spaced and of sufficient duration. When high heat and humidity in the plant cannot be remedied, he said, satisfactory physiological recovery cannot be achieved unless workers rest at regular intervals in an air-conditioned room where temperature and humidity are controlled at a comfortable level.

Working Positions

In other instances, studies of working stresses have determined where mechanization would be most efficient in reducing fatigue or the extent to which work crews should be increased. Sometimes the working position of the body is such as to tax muscles which do not produce mechanical work but merely help to maintain balance. In one case, fatigue was markedly reduced by building a platform so that employees could work at waist instead of shoulder height.

Whenever a change in job practices is made, heart rate and body temperature measurements can be used to determine whether the modifications have been effective in reducing the stress of the work, Dr. Brouha observes. Similar studies, which indicate physical aptitudes for certain kinds of work, have assisted in selection of employees. In addition, it has been possible to evaluate the relation to fatigue of age and sex of the workers, their state of nutrition and exposure to certain toxic chemicals.

"Failure to drink plenty of cool water in hot weather promotes fatigue and, moreover, a man's thirst is not a reliable indicator of how much water he needs," Dr. Brouha explains. Physiological tests have been used to determine amounts of water workers require to replenish body fluids lost through perspiration. Workers then have trained themselves to drink fixed amounts at regular intervals, much as a sick man with a fever "forces" liquids. As a matter of fact, men working in hot areas who did not drink enough water were found to run temporary "fevers" of 100° F. and higher.

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Industrial Hygiene

Associate Editor
Jacob A. Goldberg, A.M., Ph.D.

New Occupational Diseases–Diesel Itch

HAZARDS in industry are not always expected and foreseen. If an industry is modified and changed to any degree, new hazards, which are difficult to prepare for, are bound to arise. The latest illustration of this is the hazard from sodium bichromate, known to physicians for years, which has inflamed the skin of a few railroad workers since the substitution of diesel for steam locomotives.

Three doctors working in collaboration, Leonard F. Weber, Edmund N. Walsh, and Malcom C. Spencer, explain that the new disease, diesel itch, has worried some employees needlessly. The disease affects less than 1 percent of diesel locomotive workers who are, directly or indirectly, exposed to radiator fluid containing sodium bichromate. Already safety engineers are paying more attention to this hazard by insisting on proper preventive and protective measures for those workers who are sensitive to the chemical in the radiator fluid of diesel locomotives.

While it is true that the disease affects only a small percentage of workers, it is costly when it does. A Chicago jury recently found a railroad company guilty of negligence in a case involving diesel itch and awarded $90,000 to three dermatitis victims. One railroad machinist was awarded $42,000; a second $19,500; and a pipefitter $28,000. The case was the first of its type in Illinois under the Federal *Employers Liability Act*. A precedent for the action was set last spring when a United States District Court jury in Philadelphia awarded $10,000 to a worker who had contracted dermatitis in a diesel shop in Pennsylvania. In the Illinois case the railroad was said to be using a chemical containing chromate in the cooling system of the diesel locomotives.

When an intelligent employee learns of a new hazard in his occupation he makes an effort to protect himself against it. Diesel locomotive workers, therefore, should know what is in radiator fluid. Many of them know that radiator fluid cools the diesel engine as the engine in their automobile is cooled. They should also know that a chemical in the radiator fluid could irritate the skin.

Fluid Ingredients

The ingredients of radiator fluid used in the cooling unit of diesel locomotives are about as follows: sodium bichromate, soda ash, disodium phosphate and sodium silicate. Approximately 1½ pounds of these powders are dissolved in 2 gallons of water in an open bucket. The sodium bichromate in this solution is about 6 percent. This concentrated solution is poured into the radiator of the diesel locomotive, which is then filled with approximately 210 gallons of water. The final concentration in the radiator fluid is about .08 percent sodium bichromate. The concentrations of the other ingredients are not a hazard to the skin.

Workers who prepare and transfer the concentrated mixture and solution receive the maximum exposure to the chromate salt, and are usually affected first with inflammation of the skin. Other employees, however, engaged in cleaning or repairing diesel locomotives, or in the shop area, are exposed to a weaker concentration of radiator fluid. The occurrence of diesel itch is less likely in these areas. Leaky pumps, radiators, or engine jackets soil the locomotive parts and increase the exposure to radiator fluid.

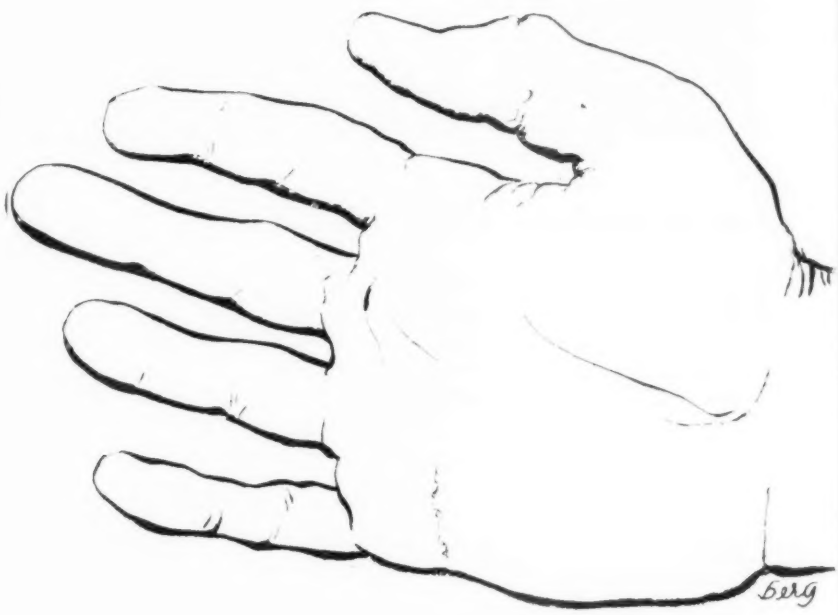
The worker affected with this disease shows inflammation of the skin on the hands and wrists, and occasionally the ankles. The areas of maximum exposure to radiator fluid in the diesel worker are the hands and wrists; for this reason the itch naturally begins there first. The eruption is characterized by redness, thickening, and scaling of the skin. As a rule, *(To page 55)*

MORE THAN JUST

Industrial skin cleansers now do more than simply get hands clean. New antiseptic properties enable them to sterilize as they remove dirt.

FEATURE

Third of a feature series on Skin Protection. The first two articles appeared in the July and August issues.



By

M. MARTIN MAGLIO

and

JOHN M. HANNEGAN

Vestal Laboratories, Inc.

St. Louis, Missouri

DURING the last 25 years, the safety and medical directors of industrial plants, as well as plant management, have become acutely aware of a need for combatting dermatitis and similar occupational hazards.

One simple way is to provide employees with an industrial skin cleanser that not only removes soil from the skin; but, at the same time, leaves it resistant to irritation and dermatitis.

In the last two decades, industrial skin cleansers have changed in composition from very harsh, abrasive products to, in some cases, mild, carefully formulated, efficient products which are not only non-irritating in themselves, but to which have been added skin conditioning agents or emollients to replace the natural skin oils which may have been removed either through work or washing. While these products are a very great improvement over their predecessors, it is conceivable that this skin conditioning might well include protection against bacteria in addition to providing the emollient materials needed to avoid skin dryness.

The great impetus to the development of germicidal soaps during the last 10 years, has had its impact on industrial skin cleansers and the desirability of incorporation of antiseptic properties in these hand soaps has been recognized. The industrial worker then would have the additional protection of a low bacterial level on the skin, making him less prone to infection from scratches and abrasions.

The development of antiseptic soaps, both bar and liquid, has reached a relatively high level. Let us review the effects of these products to provide a background for a study of the properties exhibited by powdered antiseptic skin cleansers.

It has long been established that ordinary soap is capable of removing "transient" bacteria and a small part of the "resident" bacteria from the skin. This removal is primarily mechanical and not bactericidal. It has been demonstrated also that the regular use of bar soap containing 2 percent hexachlorophene produces a marked reduction in the "resident" bacterial population. Also it has been shown that liquid soaps containing 2 percent hexachlorophene (of their soap content) are more efficient than bar soap in reducing the bacterial level on the skin. Careful washing without a brush with these liquid antiseptic soaps has replaced the conventional 10-minute scrub with a brush in the

CLEAN!

surgical wash to prepare the surgeon's hands, as well as for use as a bacteriostatic wash in the preparation of the patient. Clinical studies of the repeated use of hexachlorophene soaps have shown no tendency for these products to produce irritation of the skin. Some researches show that some bacteriostatic protection is afforded for several days after discontinuing the soap's use, so that protection over the 2-day week-end is provided for persons who wash with these soaps consistently during the 5 working days of the week.

The maintenance of this remarkable bacterial reduction by the regular use of these antiseptic soaps made the development of a powdered skin cleanser for industrial use very desirable, as it would provide the bacteriostatic protection heretofore lacking in such products. With this in mind, two antiseptic powdered soaps were prepared, one with hexachlorophene and the other with bis-(2-hydroxy-3,5-dichlorophenyl) methane, which is under investigation. A powdered skin cleanser was also prepared which contained exactly the same ingredients except for the germicide. Its effect on the flora of the skin was then compared to the effects of the powdered germicide cleanser and ordinary bar soap and liquid antiseptic soap. The composition of the antiseptic powdered soap cleanser follows:

ANTISEPTIC POWDERED SKIN CLEANSER

Organic Scrubber	41.50 percent
Water Softeners and Detergents	8.75 percent
Soap	31.00 percent
Emollients	1.75 percent
Hexachlorophene or bis-(2-hydroxy-3,5-dichlorophenyl) methane *	.65 percent
Diatomaceous Earth	13.40 percent
Moisture	3.00 percent

* 2 percent of the soap content.

The bar soap used was the variety of toilet soap normally used by the particular subject in his home washings. The liquid antiseptic soap employed was a liquid soap containing 2 percent hexachlorophene (of the soap content). Experiments with these soaps were carefully conducted to maintain constant and comparable washing procedures throughout. The area washed, the quantity of cleanser, the length of washing and rinsing processes and the interval between washes were maintained constant. Each subject washed 3 times daily at spaced intervals for the 5 working days of the week. Unmedicated bar soap was used over the 2 day weekend. Three basins were used in which the hands and arms were scrubbed in a uniform manner for the same length of time. This procedure was based on findings that if a series of basins is used, the flora of the skin will be reduced at a constantly diminishing rate.

Immediately after the subject finished washing and rinsing in each of the basins, the rinsings were sampled, plated and incubated. The number of colonies present

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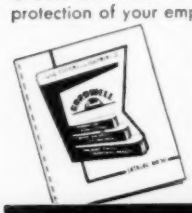

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was then determined. The low bacterial counts obtained in the use of the antiseptic soaps were attributable directly to bactericidal action of the germicide and not to the mechanical removal by the soap content. Extremely low concentration of the germicide was sufficient to kill a much higher concentration of bacteria.

Results of the experiments show that the powdered skin cleanser without germicide is much superior to bar soap without germicide; also, that the powdered antiseptic cleanser is 60 percent more effective than the same cleanser without germicide. More important, the degerming effect of the antiseptic powdered cleanser is equivalent to the degerming effect of the liquid antiseptic soap.

The superior degerming effect of the powdered skin cleanser without antiseptic properties is attributed to its superior detergent action and the efficient scouring action of its organic scrubber. Also, the comparison between the degerming effects of the two types of antiseptic powdered skin cleansers shows that their degerming properties are equivalent.

Since the capabilities of both germicides are equal and the experiments show their antiseptic action to be the same in liquid and powdered cleansers, it is apparent that powdered antiseptic skin cleansers using these germicides are a valuable addition to the family of antiseptic skin cleansers. They provide 60 percent more effective bacterial removal than powdered skin cleansers without germicide and are bacteriologically as effective as liquid antiseptic cleansers, heretofore the best antiseptic cleansers.

From a paper presented before the Food and Sanitation and Laboratory section of the American Public Health Association meeting in Cleveland, Ohio.

For detailed descriptions of skin cleaning products see pages 262–270 of "Best's Safety and Maintenance Directory," 1952–53 edition.

Public Health Association Meeting

NEWS of latest developments aimed at preventing disease and promoting personal and public health will be exchanged by professional workers from all parts of the free world at the 81st annual meeting of the American Public Health Association and 40 related organizations in New York, November 9–13.

More than 5,000 public health workers—physicians, dentists, nurses, engineers, statisticians, veterinarians, sanitarians, nutritionists, health educators, entomologists, biologists and others—are expected to attend the sessions. Theme of the meetings will be "Meeting the Health Needs of the Community."

Sessions will be devoted to industrial hygiene and sanitation, school health programs, nutrition and dietary developments, control of animal disease, maternal and child health, accident prevention, home nursing, laboratory and engineering developments, and work with handicapped children of various types.

Catalyzing Air Pollution Problems

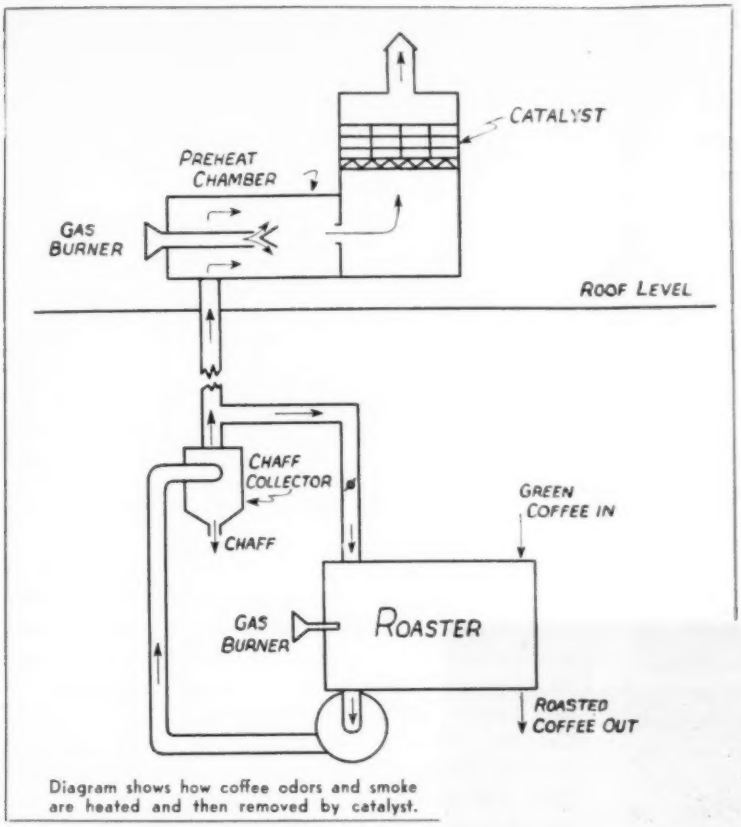
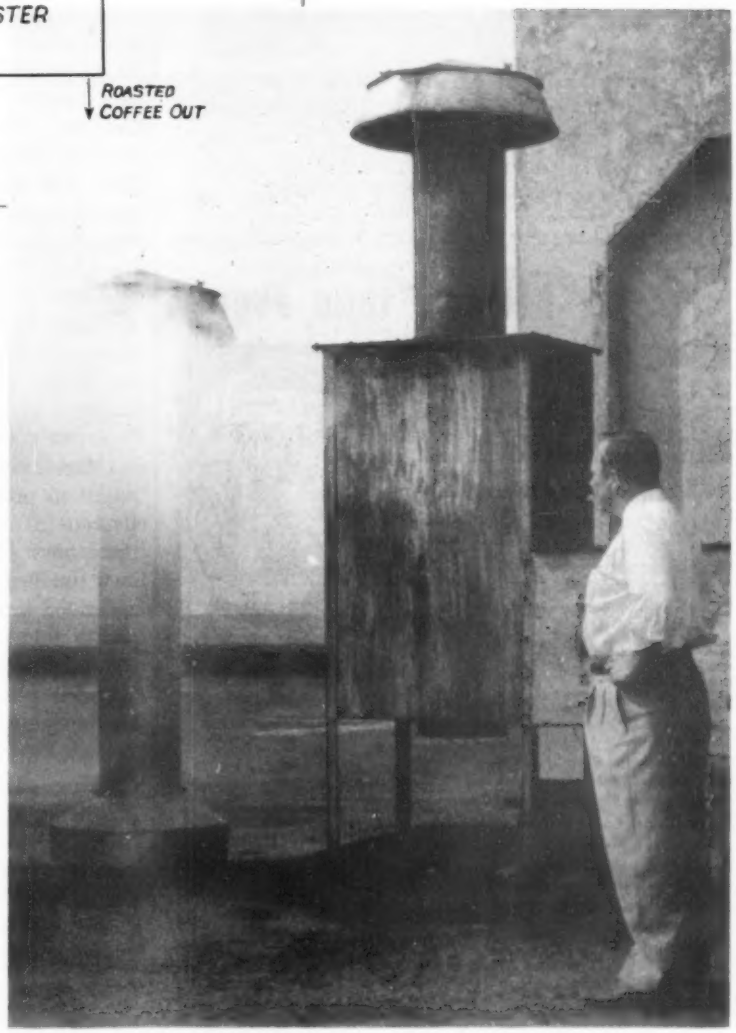


Diagram shows how coffee odors and smoke are heated and then removed by catalyst.

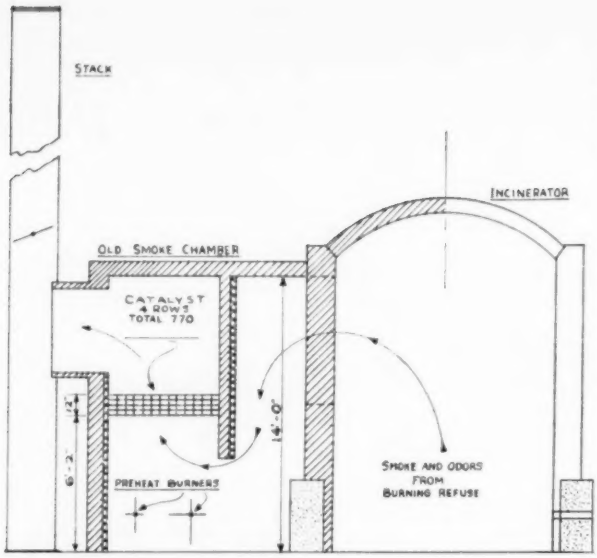
AN OXIDIZING catalyst, a scientific device that has already purified fork-lift truck exhaust, run a factory on its own smells, and removed the belching smoke of incinerators, now promises to cure many big-city air pollution problems.

A plant-size demonstration model, a coffee-roasting plant in New York City, was used recently to show city and industry officials how the new catalyst can help solve coffee plant and other city odor problems. In a roof-top demonstration, inventor Eugene J. Houdry, pioneer in the catalytic cracking of petroleum, illustrated how the catalyst, installed in the exhaust stack of one of the plant's fourteen coffee-roasting ovens, completely oxidizes rank coffee fumes that result from the roasting process.

While several of the plant's exhaust stacks not equipped with the catalyst were pouring forth a dense cloud of acrid coffee smoke and steam, observers could smell and see that a completely odorless, invisible effluent issued from the stack equipped with the catalyst.



Seeing (and smelling) is believing as plant manager observes how catalyst in stack at right removes odorous smoke, while stack without catalyst belches fumes.



Smoke and odors from burning refuse in incinerator are preheated to proper temperature in chamber at left and then pass over catalytic rods which remove both odor and smoke leaving harmless effluent.

The catalyst has been on trial for a month and the company management reports that it has removed all traces of coffee odor and smoke. On the basis of this performance the company plans to equip the remaining 13 coffee roasters with the catalyst.

The catalyst is a cage-like structure of porcelain rods coated with an alumina and platinum alloy which permits the combustion of coffee fumes at 500–550 degrees—much lower than the temperature required for direct flame incineration. In addition, the catalyst installation is much more economical, costing about one-half of the amount for incineration.

The fumes arising from the coffee roasting process consist of a steam-coffee oil-chaff mixture. The catalyst prevents the escape of this odorous gas to the atmosphere. As the gases rise through the exhaust stack they are preheated to 500–550 degrees before entering the catalyst chamber. The fumes then flow across the alumina and platinum alloy coated rods. The hydrocarbon coffee vapors are oxidized to harmless carbon dioxide and water vapor. Any chaff that has escaped is burned in the process. The large volume of saturated steam entering with the gases is superheated to an invisible gas.

The catalyst is capable of removing a wide range of pollutants. It can be used successfully for pollution control and often for profitable waste heat recovery, wherever combustible gases or fumes are the source of pollution. A belching offender, a municipal incinerator in Los Angeles, was brought under control by the catalyst recently. Previously, the incinerator had been shut down by complaints from neighboring communities. The rubbish it was burning: garden, lawn and shrubbery trimmings, caused a great deal of smoke. It went back into service after catalytic installation was complete. There were no complaints. The city engineer said most people didn't even know the incinerator was working. Applications of the catalyst to the Los Angeles smog problem have also been suggested.

Other Uses

Other examples of the catalyst's ability to conquer pollution problems come from Pennsylvania and New Jersey. In a metal-finishing plant in Allentown, Pa., the catalyst has literally enabled the plant to run on its own smells; for, in oxidizing noxious gases the catalyst generated enough heat to supply 90 percent of the plant's fuel needs. The heat is then piped back into the plant. In a novel case of in-plant pollution, a Camden plant used the catalyst to burn off a thick smoke composed of wax fumes and particles.

Usable heat has been recovered from waste petroleum cracking gases and objectionable exhaust from the petroleum cracking process has been removed by the catalyst. It has also been applied to recover heat or eliminate pollution or both in other industries from powder metallurgy and printing to fish curing and metal coating.

Designed originally to remove hydrocarbon fumes from engines running on non-leaded gasoline, the catalyst is now being perfected for use on diesel and leaded gasoline engines. This use could end a major source of metropolitan air pollution—the hydrocarbons

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exhausted by city buses and automobiles.

The inventor of the catalyst, Mr. Houdry, has devoted his life to the study of catalysts. His method of cracking petroleum was introduced in this country in 1937 and accounted for 75 percent of the high-octane aviation gasoline used by the Allied forces in the first two years of World War II. He also developed a catalytic process for making synthetic rubber from petroleum.

Following the war, Mr. Houdry's research produced the catalyst which burns carbon monoxide given off by unleaded gasoline-driven engines, converting it into harmless carbon dioxide. Now the catalyst is being applied to industrial processes, air pollution control and other problems. Mr. Houdry says his catalyst can be applied to any process in which heat is generated from fuel—which means most industry—and he is proving it.

Pictures by courtesy of Oxy-Catalyst Inc.

Diesel Itch

(Continued from page 49) the eruption tends to localize in patches.

Following the avoidance of the chromate compounds, the eruption or itch lessens and disappears within 3 or 4 weeks. This is the usual course, though it may persist for several months. If a recurrence follows upon exposure to chromate compounds, a change of work is in order. It has been found that workers recovering from diesel itch are able to work on steam locomotives without subsequent trouble.

Suggested Precautions

1. Rubber gloves, rubber boots, rubber aprons and sleeves should be worn by workers handling chromate compounds in the dry form or the various solutions. A protective ointment should be applied to the hands and forearms before exposure to the substance.

2. Careful workers who are not likely to spill the radiator fluid on the locomotives and work area should be selected. Leaky parts of the cooling system should be repaired promptly by workers adequately protected. Radiator and motor parts should be thoroughly washed with water to remove any chromate compound before they are transferred to the shop area.

3. Diesel workers who are sensitive to chromate compounds should be transferred to other work, thereby eliminating exposure to the substance.

4. Redesigning of equipment should be undertaken, in which the filling and draining of the cooling systems of the diesel locomotive is simplified.

Diesel itch is a new hazard in the railroad industry, but it has been known in the tanning and plating industries for a long time. It is a definite danger, but there are methods to deal with it effectively. It can be serious enough to require expensive compensation, but it will not produce permanent disability. Diesel itch is a hazard; it is known and should be respected; but it can and should be combatted, not feared.

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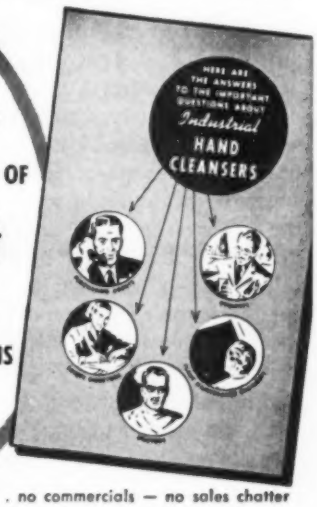

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The Industrial Nurse

Editor
Rosamond J. Webster
R.N., A.M., Ph.D.

The Prepared Mind

THE famous French chemist, Louis Pasteur, commenting on his successes, said that "opportunities come to the prepared mind." There is a good deal of practical wisdom in this statement. In Pasteur's case, his careful preparation set the stage for his later remarkable successes in chemistry. Another well-known example of the prepared mind seizing an opportunity for further investigation with practical results that have been far-reaching, is the case of Dr. Fleming and his achievements in the field of antibiotics, especially his work on penicillin.

The same principle of achievement by the prepared holds true in other fields of service, including industrial nursing. The experienced, well-prepared, industrial nurse who is ever on the alert to keep pace with developments in several related fields; who belongs to her professional society; who carefully reads nursing journals, articles on industrial hygiene, and related literature; and who keeps abreast of laws enacted in her state that affect the treatment of accidental industrial injuries and the rights of employer and employee—such a nurse is developing a prepared mind for her job. There are other areas of necessary learning that can aid her in fulfilling professional responsibilities and prepare her to meet emergency and unusual situations. She may never have to deal with such technical problems as those faced by Pasteur and Fleming. But, she can be prepared to meet the usual, and occasionally, unusual demands of her job.

Dog Tired

WORKERS frequently complain to their associates, families and to the industrial nurse that they are "dog tired," that is—simply very tired. The quantity and quality of their work suffer, and their weariness is therefore of interest to the medical department. If the complaint comes after a week-end of partying, dancing, drinking, over-exertion on a long automobile trip, excessive physical exertion in caring for a sick member of the family; or because of excess in physical exercise—the remedy comes quickly. One or two nights of rest and sleep will usually remedy the condition.

If, on the other hand, the complaint persists for days or even weeks, then it seems advisable for further inquiry—by the industrial nurse, if the matter comes to her attention. Slowness or inaccuracy in work, frequent visits to the medical department, absenteeism that becomes a more or less common phenomenon among certain workers—all these warrant close study. Rest, suitable recreation, adequate sleep and suitable food will usually remedy the occasional feeling of tiredness, but when the condition persists careful and detailed inquiries are in order. For instance, such a continued state of tiredness may be an early symptom of pulmonary tuberculosis, or some other pathologic condition. Among many it may represent a strict diet regimen, with black coffee and a cigaret for breakfast; not much more for lunch, and an inadequate meal for dinner—all in the effort to get or to remain thin. Many have flirted with serious deficiency illnesses following such an inadvisable type of dieting. Here is a fertile field for health education by the nurse. Eating balanced meals and not gaining weight is a valuable way of preventing the feeling of being "dog-tired."

Industry Is Not Alone

MUCH emphasis has been placed on the accident rates in various types of industries. The workmen's compensation laws were written and enacted primarily to provide some measure of protection to workers injured or killed in industrial construction, and related jobs. However, we do not generally get a complete picture of non-industrial injuries and death.

Secretary Durkin of the U. S. Department of Labor, in an address before the Federal Safety Council, frankly presented the facts available to him. Those indicate that in 1951, Federal employees were killed at the rate

of 5 a week, mostly in traffic accidents. Ninety-one thousand were injured. At the time of the Secretary's address the 1952 figures were not available, but there was then no evidence of any radical change for the better. Over 3 million man-days of production were lost in 1951 and the Government paid out nearly 27 million dollars in employee compensation. When indirect costs are added, it was conservatively estimated that the total cost probably exceeded 100 million dollars. This is a stupendous sum which largely represents human and financial wastage.

While the Federal Government is the overall largest employer in the country, still this picture as outlined by the Secretary of Labor throws on a wide screen the huge losses in health, life, production, and money inherent in accidental injuries and loss of life. While the budget of the Government virtually engulfs this loss without visible difficulty, when translated and prorated to comparatively small employers, these kinds of losses may spell ruin to an otherwise successfully functioning business organization. It is therefore a challenge to all concerned with the prevention of accidents, illnesses, injuries, and deaths to look into the gross situation and appraise the part they are designated to play in the process of prevention. The challenge to nurses in industry is inherent in the very nature of their jobs.

Telling The Patient

MUCH service rendered by physicians and their professional associates goes to waste because the verbal instructions given to patients are either not understood, or misinterpreted. When asked if they are aware of what they have been told, they usually say they are, when this is not really the case. There are many situations where the inexperienced professional man or woman has used technical terms which could not be understood by the worker. And yet, when asked if he understood what the physician or nurse told him, he usually shook his head in the affirmative.

The same type of situation occurs in class rooms at various levels. A distinguished educator cites the story of the teacher who described the equator as "an imaginary line running around the earth." In answering a question regarding the equator a child in this class wrote: "The equator is a menagerie lion running around the earth." It is easy to see how such a new and theoretical concept might get mixed up in the mind of a child. But, might not the fault have rested primarily with the teacher who was not extra careful in her pronunciation and enunciation.

For the industrial nurse who is left to pass on instructions to troubled, ailing, distressed and injured workers; to some whose command of English is not good; to

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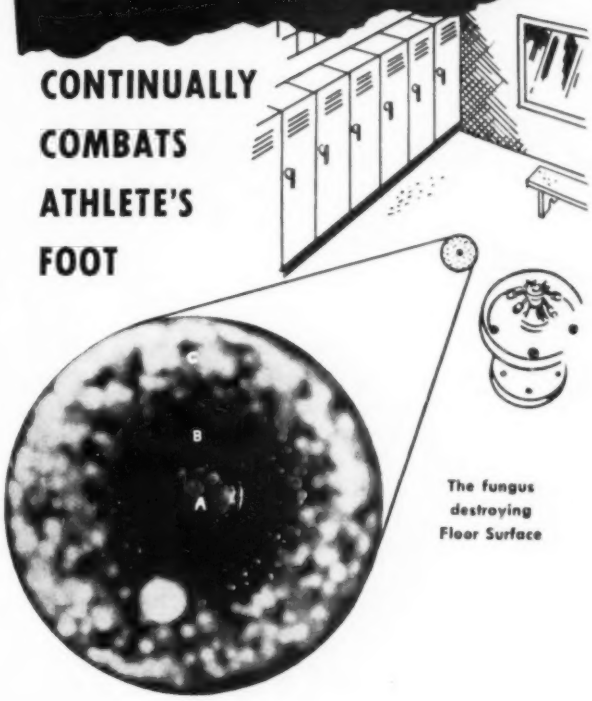

The fungus destroying Floor Surface

The photograph above illustrates the inhibitory action of Hubbellite on Tricophyton interdigitale (the cause of Athlete's Foot). The white area marked (C) is a heavy growth of mold colonies that appear under a microscope as tiny white threads. When a thread fragment enters the skin and starts the growth of other mold colonies, the result is Athlete's Foot.

(A) is a piece of Hubbellite, cupric onychloride cement.

The dark area (B) is a clear area which is free from mold growth—visibly showing how the mold growth has been retarded when it came in contact with Hubbellite.

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those to whom the word "abdomen," for instance, has no meaning, whereas "belly" is fairly descriptive—these and many other situations lend themselves to serious misunderstandings. A big job the industrial nurse has is being a good teacher, whether to groups or individuals, or both. Instructing the ailing and injured worker how to carry out medical advice and orders is a major responsibility. This can only be discharged effectively if good teaching methods are used as applied to patients; if patience is exercised; if clear, simple, written instructions are given when called for.

Difficult Personalities

THERE are some workers who always seem to be in conflict with supervisors, fellow workers, members of their own families, and almost everyone with whom they come in contact. They are quickly classified by their associates with uncomplimentary labels and are shunned. This only tends to make them more difficult to get along with. They are often defined as being psychopathic personalities and are one of the most difficult industrial problems.

The group may include individuals who are often of high intelligence and in many ways show marked abilities. However, because of their personality make-up, their inability to get along with others is pronounced; they are inclined to be egocentric, irritable, suspicious and even childish in their attitudes. Many of them are badly adjusted and are as unable to fit into society as frank psychotics. Frequently nothing can be done with the pronounced case of psychopathic personality, although there may be some positions where such an individual works more or less by himself, and thereby avoids the difficulties of having to adjust to others. Severe problems may arise when such personalities achieve positions of responsibility as managers, superintendents, foremen, or as elected officials of workers. It is in the latter case that they may be particularly difficult to deal with insofar as the medical, personnel, and administration divisions of industry are concerned.

The question as to what the industrial nurse can do in dealing with constitutional psychopathic personalities resolves itself into reporting the frequent visitor to the medical division; especially when most, if not all such visits are medically unnecessary; bringing to the attention of the medical director complaints of fellow workers, especially if these seem justified; and in general, seeking to adjust such personalities to their working environment and fellow workers if dropping them from the payroll is deemed to be inadvisable.

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Future of Industrial Nursing

A LEADING industrial nurse consultant, in discussing this topic, points out that 50 years ago the first nurse was employed in industry. At present, about 14 thousand are employed, but most of these nurses have had not more than one year of experience in industry. This fact is important, especially when it is recognized that the basic training of a nurse does not include any industrial nursing subjects. Her courses in the hospital are primarily directed toward caring for the sick.

Unfortunately, the average employer in industry goes on the assumption that the nurse he engages for work in his plant is competent in the various phases of industrial nursing. Where a full time plant physician is on the job, he may handle many of the problems that are beyond the knowledge of the beginning nurse, provided he is adequately trained for work in industry. Again, as in the case of the nurse, comparatively few physicians have received such training. Since courses for industrial nurses are comparatively few, and those that are available are chiefly in large communities, the beginner in industrial nursing must often depend on her own ingenuity, effort, trial-and-error methods, and reading.

The future of industrial nursing depends on expansion of service, and upon training of present and future nurses who may select industrial nursing as a career. The recognition by industry as a whole, and especially

by management and safety personnel of the opportunities of the nurse for broadened service and research relating to causative factors of accidents and illnesses, is still another important factor in the future of industrial nursing. Giving the nurse a place of responsibility in helping to consider and determine plant policies that affect her work, will in the long run make her a better industrial nurse in all phases of her activities. In the last analysis, however, the future of industrial nursing depends upon the industrial nurse herself—on her genuine interest and ambition—on her all other factors depend.

Protecting the Eyes

THAT there are altogether too many eye injuries in industry is a generally accepted fact. Oddly enough, in many instances neither the employer nor the work process is at fault. It is one thing, as many safety engineers, industrial nurses and others recognize, to instruct workers how to protect their eyes, and quite another to get all workers to follow this advice at all times.

There are, of course, various reasons for this negative employee attitude. It is sometimes due to the fact that the goggles or other eye safety devices provided by the employer are inadequate and uncomfortable to wear. Inadequate and unsatisfactory instruction methods can produce the same result.

Many industrial organizations have instituted measures to eliminate potential eye injuries. Humane and purely economic interests have played a part in these measures. Coupled with increasing attention to careful and thorough eye examinations previous to employment, plus periodic re-examinations, the number of eye injuries has been markedly reduced. Responsibilities placed on employers by workmen's compensation laws; the safeguarding of machinery; the activities of safety engineers and industrial nurses too; and attention to proper illumination have all contributed to this reduction.

However, much still remains to be done; and the job of education and guidance will never end. New workers, new and possibly hazardous substances require continuing attention. In daily contacts with many workers, the industrial nurse has an opportunity for effective educational and preventive work. Her personalized services can be put to especially good use in the eye protection field.

Overweight and Longevity

THE American public has become distinctly weight conscious. Among women the natural desire to retain a youthful body contour to meet the standards of beauty and attractiveness are strong maintaining forces. Among men there are similar desires, coupled with an active physical program, whether in the gym, on the tennis court, in the pool or on the golf links. The teaching for the past generation that health and longevity are closely related to overweight has likewise had a stimulating effect in inducing the population to correctly control its food intake.

The question has been raised as to whether those who are appreciably overweight and follow an effective plan of weight reduction thereby favorably affect their longevity. Studies by competent insurance company statisticians have shown that there are long range benefits from weight reduction. In a study that covered a group of insured persons for a period of 25 years it was found that the mortality of all overweight persons was significantly higher than that of standard risk persons. Out of this study another was made of the overweight individuals who subsequently showed a reduction in weight sufficient to qualify them for standard insurance on a lower rating than they had been given previously. Among both men and women the death rate after weight reduction was substantially less than that for all overweight persons studied. This is fairly clear evidence that weight reduction continued to a desirable point and approximately maintained at that figure does add to useful length of life. Here is an area of industrial health education in which the plant nurse can carry on an effective job.

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TELL 'EM, TELL 'EM . . . AND TELL 'EM AGAIN!

IN CHOPPING weeds around a gas control valve, an employee accidentally hit some copper tubing connecting meter to gas line. The copper tubing, with about 600 pounds of pressure on it, was broken out. The way to avoid this kind of accident, like all accidents of the "I didn't know . . ." kind, is to inform employees of the purpose of the equipment near which they may work and to caution them of the danger if the equipment is mishandled or broken. Instruction is the way to stop an accident before it happens!

EATING WORDS

A STEEL plant hammerman said it all started when he got into an argument with another employee. Trying to get the last word, he bit his tongue so hard it required four stitches. The moral of this story might be that hot words are not the best method of smoking tongue. More seriously, however, the reason we run this story in a safety publication is that mental attitude is one of the most important factors in employee safety. The man who is angry, has a chip on his shoulder, worried or thinking of something else is many times more prone to accident than the relaxed, happy person. This man's anger might have led him into a much more serious accident than biting his tongue. Try to leave your troubles outside the plant; but, if they seem serious, take them to a qualified person for advice.

DON'T FENCE IT IN!

TOO many accidents listed as carelessness are caused by congestion. If a man hasn't room to work, he's accident prone no matter how much care he takes. In one such accident a man was adjusting burners on a primary dryer when his arm came in contact with a hot oil feed line. He suffered first degree burns of the upper arm. The trouble lay in the fact that there was not sufficient clearance between the burner controls and the feed line. Adjustment was dangerous no matter who was doing it. If the space cannot be increased without a major structural change, the worker on the job should be provided with arm protection.

THE SLICK SPOT

SLIPPERY conditions are a plant problem under certain weather conditions in almost any industry. They are especially a floor problem around machinery and washrooms. In both these cases careful maintenance, prompt reporting and the use of absorbents will cut accidents considerably. Lighting, constant and effective, will leave no dark areas where workers cannot see danger spots. But, the most direct way to stop slips and falls on wet or oily floors is to keep workers constantly alert for danger. In this instance, a worker was coming out of a washroom, stepped on a wet spot, slipped and cut his knee. The report doesn't state whether the spot was marked or easily seen, but the point is still the same: attention to walking would have prevented the accident.

THE SAME OLD PROBLEM . . .

THE leading cause of fires is still carelessness with matches and smoking. Perhaps, the reason for this is that it is difficult to protect against the hazard since the most important pathway to protection is education . . . always a hard road to travel. Making everything as fireproof as possible and prohibiting smoking in dangerous areas helps, but until people are educated to understand and observe the responsibility that goes with smoking and being able to make fire (the latter something the cave-man learned how to do long ago) they will have to go on learning about fire the hard way!

In the particular instance which we have in mind, a fire in a second floor stockroom of a textile manufacturer was started when a cigarette dropped through a louver from the floor above. It landed on a dress rack and ignited some hangers made of combustible material. Luckily, the establishment was protected by a sprinkler system which kept the blaze under control till firemen arrived. If the hangers had been non-flammable the fire might never have started; but if someone had been careful with his cigarette, the fire definitely would not have occurred.

Learning . . . . the hard way

CLEANLINESS IS NEXT TO . . . SAFETY!

THE connection between safety and keeping a plant clean by good maintenance seems very clear, yet we are constantly coming across accidents caused because the connection was forgotten or ignored. In one instance the plant electrician was doing some routine maintenance work overhead. A short circuit occurred which ignited a deposit of oily residue on a nearby steel column. Fire flashed over the connecting girders to the roof. The electrician escaped uninjured, but two hours were required to put out the blaze. Although a contract had been let for the cleaning of the structural steelwork, it had been postponed by hot weather. The fire occurred three days before the work was to have been done. Enough said!

WHAT GOOD IS IT?

WHAT good is safety equipment if the employee doesn't wear it? The answer is no good at all. In this particular case an employee was assisting a welder in a dryer duct. The welder was shielded from his torch but his assistant had no eye protection whatever. In a short time he was a victim of welder's flash. Goggles, respirators and masks were provided but not used. The man has been reinstructed to use goggles whenever he is near welding, but he has had a painful lesson. Even when the worker is not directly doing dangerous work, he should wear protective equipment if he is merely in the vicinity.

THE OPEN DOOR POLICY!

WHILE working in the plant installing a steam chest, a maintenance employee was hit in the back by a door blown shut in a heavy wind. He suffered contusions of the buttocks and arms. The door had been wired open to a guard rail, but the wire broke. The first thing to ascertain about this accident is whether it was necessary for the men to work in the open doorway. In this case it was. Was the man instructed to secure the door? He was, and had wired it open as per instructions. The trouble is that the door and the wind were both too heavy for the wire. The door should have been blocked or locked open, either with a heavy stop or with a positive locking method. Precautions are not enough unless they are thorough.

PHYSICALLY FIT . . .

THIS accident occurred when a man was getting ready to help load machinery on a truck. The ground was uneven and suddenly his ankle turned and he snapped a bone in his foot. In field operations everything obviously can't be done on even footing. Men have to be prepared to watch their step. In many cases they must be strong as well as physically sound. Normally a turning ankle wouldn't break a bone, but this man's bones were found to be very brittle in a subsequent physical examination. He was fitted with special shoes; and, we hope, moved to a different job where his physical condition was no handicap. It is difficult to discover all physical abnormalities in a pre-employment examination, but care should be exercised to narrow down the possibilities of endangering the employee by putting him in the wrong job. Any succeeding accident to the individual should be checked to see if his physical condition is suited to the job. If not he should be shifted to another type of work.

END OF A BEGINNING

A STEAM turbine at an oil refinery was being placed in operation for the first time. Apparently the men operating it were not careful enough. It blew up, 15 minutes after it was in use, killing one man and seriously injuring the other. Both men were struck by flying fragments of the turbine casing. There is scarcely a piece of equipment more dangerous than a boiler. We cannot know whether the men assumed that because it was new it was safe, or whether they were aware that it was perhaps more dangerous new than when it had been in use for awhile; but, we can say that they should not have been near enough to be struck by fragments of the casing. Precautions that are not complete are as good as no protection at all.

Most safety engineers remember Vul-Cork as the first really light cork-and-rubber safety sole.

It is still the lightweight champion.

Add that fact to its other characteristics and you have a sole that helps sell the safety idea to your workers.

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and

VUL-CORK NEOPRENE

SAFETY SOLES

Anti-Slip – won't pick up chips . . . light, resilient, flexible. Vul-Cork Neoprene resists oil, grease, acids, hot metals. Write for samples.

CAMBRIDGE RUBBER CO.
Vul-Cork Div., Taneytown, Md.
. . . makers of Vul-Cork®

(Use Key # J-34 on Inquiry Card on page 81)

INSIDE THE TRADE

Hy-Test Warehouse in Philadelphia

THE HY-TEST Safety Shoe division of International Shoe Company, St. Louis, hopes to cut as much as two to three days from delivery time to industries in the Atlantic seaboard area by shipping direct from its newly established Philadelphia warehouse, according to N. C. Whitsett, general manager of Hy-Test. This warehousing operation, first ever to be used by Hy-Test, began July 15. Mr. Milton Clark has established sales headquarters in Philadelphia and will be in charge of the warehousing operation.

Hy-Test Safety Shoes to seaboard area industries will be shipped f.o.b. Philadelphia. The warehouse will stock a wide range of safety-shoe styles for men and women. The seaboard area served from Philadelphia is comprised of the District of Columbia, the New England States, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia and the Carolinas.

Westinghouse Breaks Ground for New Research Center

WESTINGHOUSE Electric Corporation has broken ground for a new research center. Dr. John A. Hutcheson, Westinghouse vice president and director of research, turned the first shovelful of earth at a ceremony held on a 70-acre plot about 10 miles east of downtown Pittsburgh.

The new center will be approximately one-third larger than the present laboratories and will provide room for future expansion. In addition to laboratories and offices the structure will house an auditorium capable of seating about 250 persons, a cafeteria of similar size and large technical library. The new research center will ultimately replace the present Westinghouse Research Laboratories located since 1916 only a few miles away from the new site.

Sales Representative Appointed

THE John Hewson Company announces the appointment of H. E. Ransford Company, Grant Building, Pittsburgh 22, Pennsylvania, as its representative for sales, field application and servicing of its line of high voltage D. C. insulation test sets and high voltage power supplies, high speed static control systems and static alarm systems.

Oil Company's Safety Director Retires

FRANK HARRISON, Pure Oil Company's Director of Safety, will retire from the company on January 1st, but will continue until his retirement date as a safety consultant, according to an announcement from the company. Mr. Harrison, who joined the company in 1928, has been the only head of the Safety Department.

He will be succeeded by C. K. Roof of Chicago, who recently completed 25 years with the company. Mr. Roof has been Supervisor for Safety for 3 years.

New Officers at Cambridge Wire Cloth

THE Cambridge Wire Cloth Company, Cambridge, Maryland, has announced the following new officers, recently elected by the Board of Directors: Clarence Edward Pink, Chairman of the Board and Chief Executive Officer; Edward

N. Evans, President; Irwin F. Pink, Senior Vice President; Fred L. Hooper, Executive Vice President; Harold E. Pink, Secretary; Nina E. Pink, Treasurer.

Clarence E. Pink has been President of the company since 1937, when he succeeded his father, the late Edward F. Pink. From 1920 to 1937, Mr. Pink has been Secretary and Treasurer, and General Sales Manager.

Chemical Equipment Co. Appoints

THE appointment of R. E. Lenhard as Vice President-Manufacturing of the Ohio Chemical and Surgical Equipment Co., a division of Air Reduction Company, Incorporated, Madison, Wisconsin, has been announced by J. H. Humberstone, president. The appointment is effective August 1.

Lenhard, a graduate of Rensselaer Polytechnic Institute, has been employed by Air Reduction in various capacities in several Airco Divisions during the past 18 years.

Hose Company Changes Name

THE American Ventilating Hose Company, a division of Callahan Zinc-Lead Company, Inc., is changing its name to The Flexaust Company. Its products are Flexaust, a spiral-wire reinforced hose; Portovent, a hose with excellent lengthwise compressibility; and Bloflex, a collapsible hose. The company is changing its name to better identify itself with its products.

Victor W. Peterson

VICTOR W. PETERSON, 61, Chairman of the Board of the Hannifin Corporation, Chicago manufacturer of hydraulic and pneumatic equipment, died recently at his Indiana farm. Mr. Peterson was President and Board Chairman of Hannifin from 1928 to 1947 and retained the chairmanship until his death. He resided at Evanston, Illinois.

INDIVIDUAL
CUTTING OIL
SANITATION

FOR YOUR PLANT!

Here's how to prevent costly coolant spoilage and eliminate foul odors: Ask your DOLGE service man to take samples of your coolant for free bacteriological and chemical analysis. A complete laboratory report will show the correct coolant handling method for your particular operation.

Only if tests warrant it will a DOLGE STERIDOL GERMICIDE be recommended—a "tailor-made" preparation to meet your exact needs. Used as directed it will not irritate the skin or corrode metals. The cost?—Far less than a cent per gallon of coolant.

Write for Booklet "Cutting Oil Sanitation."

STERIDOL

FOR FREE SANITARY SURVEY of your premises consult your DOLGE SERVICE MAN

dependable DOLGE

WESTPORT, CONNECTICUT

(For further details, use Key # J-35 on free Inquiry Card on page 81)

No. 200 Asbestos Gloves
Lined or unlined. Plain or leather reinforced. 11, 14, 23" length.

For Safety Get Quality Asbestos Gloves

Only quality can put full safety into asbestos gloves. Steel-Grip asbestos safety gloves are quality throughout. The quality starts with the asbestos cloth . . . Underwriters' Grade 2½ lb. per square yard. You find quality in the design ...seamless one piece construction from tip to top. No seams at wrist or working edges to pull out or burn just when protection is most needed on the job. Double sewn throughout. Full cut for cool, comfortable fit.

And the manufacture is of the quality that made Industrial Gloves Company the leader for 43 years. Gloves and mittens, both plain and leather reinforced, your choice of lined or unlined, made in standard lengths of 11", 14", and 23". Special lengths to your requirement. Knitted cotton lining, 8 ounce weight, is our standard lining. Knitted linings allow quick dissipation of heat. Special linings available. A complete line of asbestos safeguards for every job hazard. Tell us what you need. Catalog free.

No. 250 Asbestos Mitts
Reversible, worn either hand giving double service. Lined or unlined, 11, 14, 23" lengths.

No. 225 Leather Reinforced Asbestos Gloves
Leather palm, fingers, thumb. 11, 14, 23" lengths.

No. 280 Leather Reinforced Asbestos Mitts
Palm, back and thumb, reinforced with heat resistant leather, 11, 14, 23" lengths.

INDUSTRIAL GLOVES COMPANY
a corporation

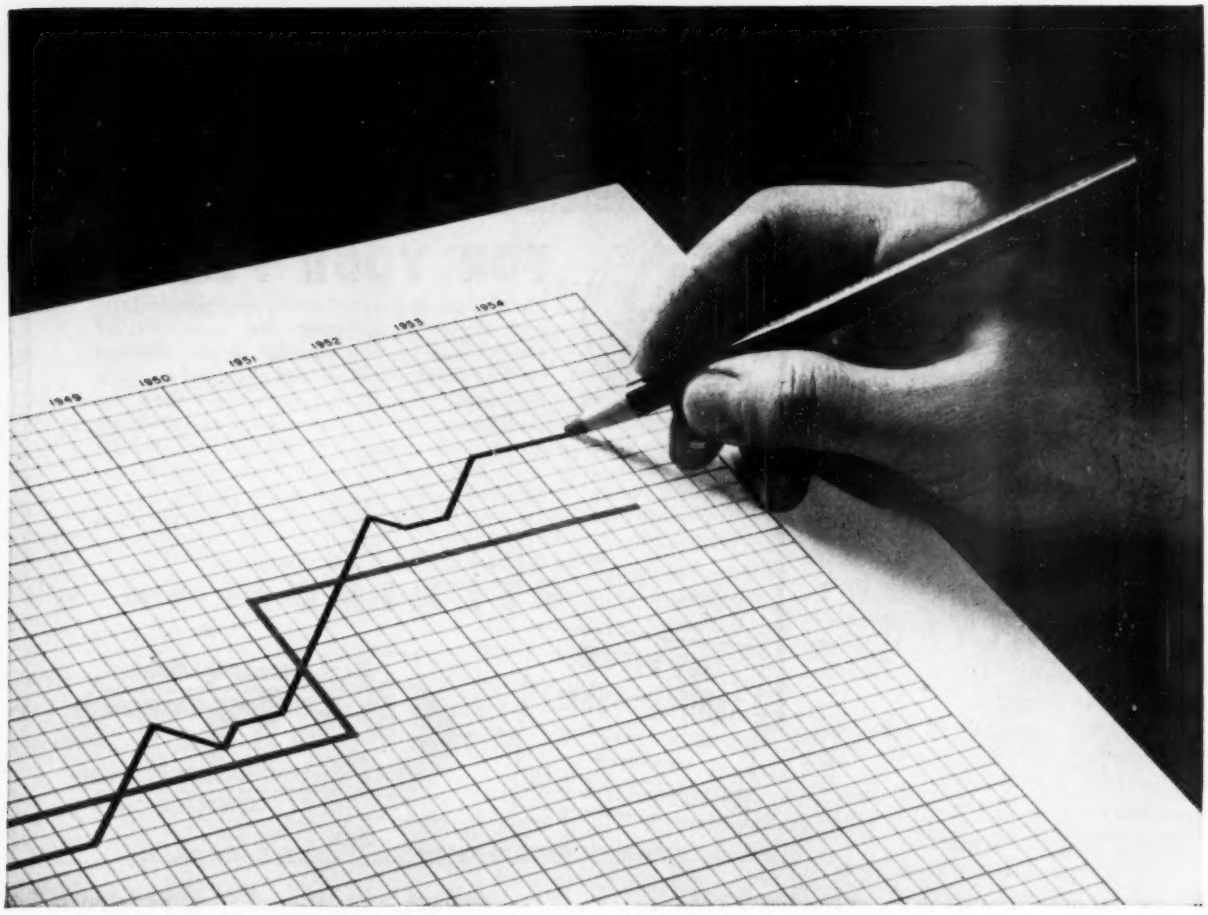
1750 Garfield Street, Danville, Ill.

(In Canada: Safety Supply Co., Toronto)

Steel-Grip INDUSTRIAL Safety Apparel
TRADE-MARK

To be sure of the Genuine Demand this Trade Mark

(For further details, use Key # J-36 on free Inquiry Card on page 81)



Caution: dangerous curves

Keeping your fire protection properly balanced with changes in processes as well as ups and downs in production is vital to efficient, profitable operation.

You'll find your best answer to this serious fire problem which is currently confronting industry by installing an expansible, fully approved C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System. Simple piping, running from one centrally located storage tank, instantly transports clean, non-damaging, non-conducting carbon dioxide anywhere in the plant area. Fire at any protected location is extinguished in seconds with an absolute minimum of expense and interruption.

Changes in your fire protection requirements are easily and economically provided for with a C-O-TWO Low Pressure Carbon Dioxide Type Fire Extinguishing System by initially installing an oversized storage tank and adding where necessary the supplementary discharge facilities at a later date.

Flexibility is the keynote . . . the low pressure carbon dioxide storage tanks range in capacity from one to fifty tons . . . discharge facilities can be either manual mechanical, manual electric, automatic mechanical, automatic electric or a combination of these . . . especially installed to fit your particular needs.

WHEN BUSINESS STOPS . . . INCOME STOPS!

Don't take chances with your investment. Secure the benefits of highly efficient fire protection engineering today... our extensive experience over the years is at your disposal without obligation. Get the facts now!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

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Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

(For further details, use Key # J-37 on free Inquiry Card on page 81)

The Fire Front

Fire-Fighting In The 25th Century!

THERE is a great possibility that we will one day see firemen change their traditional fire engines and headgear for helicopters and flight helmets.

Willis G. Labes, assistant professor of fire protection engineering at Illinois Institute of Technology, in a speech before the summer conference of the Illinois Fire Chiefs Association says that the idea of vast fleets of "fire-copters" hovering over blazes was inspired by recent helicopter studies conducted in mountainous areas. The airborne fire fighters would be free of worry about congested city traffic and in a better position to extinguish fires.

"It appears," Mr. Labes says, ". . . that the use of large scale application of extinguishing fires . . . by air . . . can be developed. Just what type . . . of agent will have to be uncovered by research."

Aviation Fire Safety

FIRE safety in aviation had a thorough airing at an Aviation Seminar at the NFPA Meeting. Outstanding speakers on everything from jet power plants to gasoline refuelers covered the field. Major emphasis was placed on hangar fire protection and aircraft crash rescue and fire fighting.

The program began with a talk by Harvey L. Hansberry, Chief of the Powerplant branch of the Civil Aeronautics Administration Technical Development and Evaluation Center on "Fire Testing of Jet Power Plants." A discussion following Mr. Hansberry's talk highlighted the research work done by the Center on jet engines with chief emphasis on methods of providing adequate fire protection.

Hangar Protection

The Association presented for adoption a tentative Standard on Aircraft Hangars developed by a special Technical Committee of the Association during the past 2 years. Nat. C. Hodgdon, Chief of the Technical Facilities Section, Architectural Branch, Headquarters, USAF outlined for the fire protection specialists "Military Requirements for Aircraft Hangars". Mr. Hodgdon placed considerable emphasis on the functional purposes of military construction in this field. Robert L. Potter, Safety Supervisor of the American Airlines, Maintenance Branch, at Tulsa discussed "Airline Utilization of Aircraft Hangars" emphasizing the maintenance functions conducted within commercial hangars and the hazards presented by such operations.

"Protection Requirements for Aircraft Hangars" was the subject of a talk by E. B. Rumble, Manager of the Special Hazards Department of "Automatic" Sprinkler Corporation of America, who has specialized in this type of protection at many military and commercial airports throughout the country. Mr. Rumble discussed the reasons for the rather stiff requirements for sprinkler protection for such buildings and allied protection methods and requirements. The subject of "Crash Protection and Rescue Requirements" was presented by top experts in the field. Gifford T. Cook, Chief Fire and Crash Rescue Branch, Headquarters, USAF, outlined Air Force developments and new equipment put into service during the past 2 years. A team from the Navy Department also reported on their progress in this field. Richard L. Tuve told of the Naval Research Laboratory's developments in "Tailor-Made Foam for Crash Fire Fighting" while Alfred W. Krulee of the Bureau of Aeronautics discussed operational procedures recommended for the employment of the new foam protection equipment developed by the NRL.

June Fire Losses Up

ESTIMATED fire losses in the United States during June amounted to $67,644,000, it is reported by the National Board of Fire Underwriters.

According to Lewis A. Vincent, NBFU's general manager, this $67,644,000 loss represents an increase of 15.5 percent over losses of $58,585,000 reported for June, 1952, and an increase of 5.3 percent over losses of $64,239,000 for May (1953).

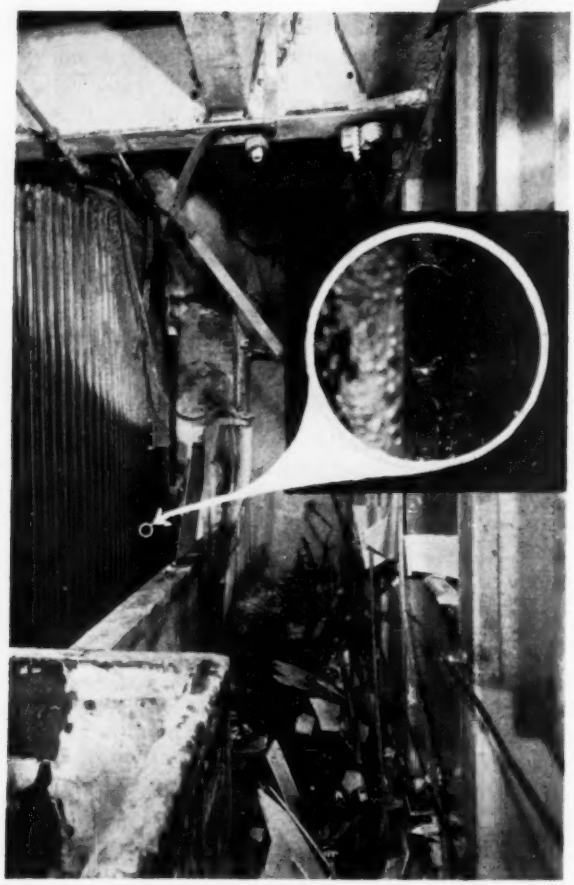
Losses for the first 6 months of 1953 now total $432,081,000, an increase of 6.8 percent over the first six months of 1952, when they amounted to $404,653,000. These estimated losses include an allowance for uninsured and unreported losses.

ELECTRICAL FIRES MEAN THIS:

FEATURE

First of a feature series on Fire Protection. Next articles will appear in the October and November issues.

By J. E. APPEL and J. A. BONO
Commonwealth Edison Co. Underwriters' Laboratories, Inc.



Close-up shows 1¼ inch hole burned in transformer casing because of failure in primary winding. Burning oil then escaped through hole and spread fire to adjacent area and equipment.

LOOK at the box score on fires, as published by the National Fire Protection Association. About one out of every 10 fires of which they have record for the decade, 1941–1951, is attributable to the misuse of electricity.

Since electricity affords one of the safest sources of illumination, power, and heat, it is well to emphasize this phrase "misuse of electricity." In it lies the answer to practically all fire troubles caused by electricity. Investigations of electrical fires show that in nearly all cases they can be prevented by proper equipment, used and installed in accordance with the National Electrical Code and periodically inspected and maintained. It is significant that where strict inspections are made of electrical installations for compliance with code requirements and with standards of good housekeeping and fire prevention, electrical fires become few and minor.

How Electrical Fires Start

Before discussing actual extinguishment of fire, let's review how electricity and what industrial electrical equipment is involved in fires. There are, normally, three ways in which an electrical fire may start; from arcing, sparking, or overheating. Several of these also can combine to cause fire. Let's examine them individually.

ARCING AND SPARKING produced through faults or overloads usually cause little trouble unless com-

FIRES RESULTING FROM KNOWN CAUSES IN UNITED STATES

January 1, 1941 to December 31, 1950.

Causes	percent of claims	percent of property loss
Matches, smoking	26.93	17.49
MISUSE OF ELECTRICITY	**11.65**	**11.21**
Exposure—fire originating on premises	8.40	11.68
Sparks on roofs	2.68	2.19
Overheated or defective chimneys, flues, etc.	5.73	6.71
Lightning	7.63	4.93
Stoves, furnaces, boilers and pipes	6.82	8.81
Open lights	3.78	2.74
Petroleum and its products	8.37	8.75
Hot ashes and coals	3.12	2.05
Ignition of hot grease	3.71	2.04
Spontaneous Combustion	2.08	6.37
Gas-natural and artificial	1.64	2.12
Sparks arising from combustion	1.15	1.91
Rubbish and litter	1.49	1.32
Miscellaneous	2.47	4.23
Friction, Sparks from running machinery	1.09	3.20
Explosions	1.10	2.17
Fireworks, balloons	.14	.08

PREVENTION MEANS THIS:

bustible materials or flammable vapors or dusts are present. Minute sparks, such as are found in the normal operation of motor commutators, are of consequence only in the presence of flammable vapors and dusts or accumulations of oily dust or lint.

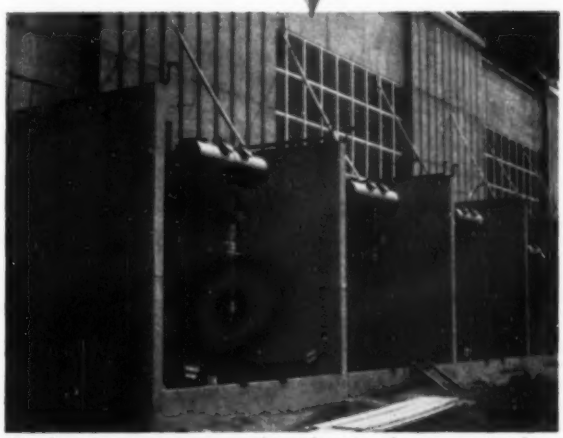
HEATING that can cause trouble is almost entirely due to overload conditions resulting from abnormal operation or improper functioning of equipment. The heat becomes a hazard because it may lower or destroy the dielectric properties of the insulation or may overheat equipment. Combustible components or flammable substances nearby may ignite.

Electrical Equipment Involved

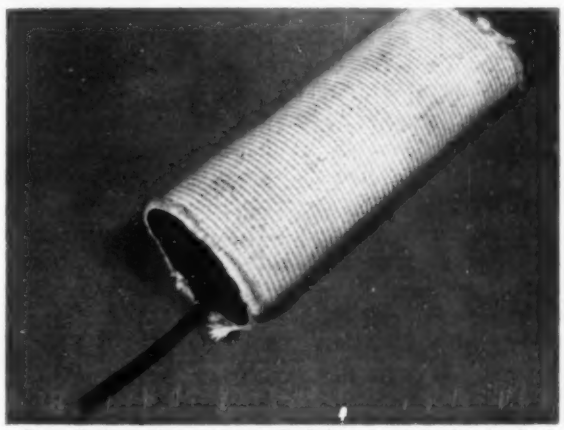
In pointing out the different ways in which electrical fires originate, it becomes apparent that there must be something to burn besides metal conductors, before electricity presents a fire hazard. This leads to a discussion of some of the equipment frequently involved in industrial and utility operations.

MOTORS, because of their universal use and abuse, are involved in a large percentage of fires. The worst offenders are the small fractional horsepower types. Common abuses in regard to motors are:

1. Failure to use non-explosion proof motors where indicated by the National Electrical Code. Arcs and sparks can ignite flammable materials or cause an explosion in combustible vapors and dusts. Often, original installations are made in nonhazardous locations, but processes change and require hazardous materials. Sometimes no consideration is given the motor hazard.



Fixed water spray system guards outdoor transformers against fire.



Ground wire in hose protects firefighters against electric shock.

2. Allowing motors to become covered with dust or lint. This causes the motor to overheat by clogging the ventilating spaces. Eventually the insulation will deteriorate and cause a short or ground which may set the motor on fire.

3. Improper over-current protection which allows motors to overheat and break down because of excessive current. On multiphase motors, over-current protection should also be designed to protect against single phasing when one fuse blows.

4. Low voltage. Heavy and sudden loads on power lines may sometimes reduce the voltage to a point where the motor does not run efficiently, causing it to burn out. A good example is this experience of a manufacturing concern. One day all lines to the factory went dead late in the afternoon because of a power interruption due to lightning. The men were sent home and the plant was left in the care of a watchman. Two hours later power was restored. Shortly afterwards the watchman, in making his rounds, found the machine shop full of smoke and could hear the sound of several motors. After sounding the fire alarm, he pulled the main switch. When everything quieted down, it was found that 5 motors in the shop had been left with their switches in the on position when the workmen left. When power was restored, there was not sufficent voltage to start the motors properly and they overheated, igniting the insulation. Some oily waste also ignited. If the fire had not been detected by the watchman, it could have resulted in serious damage.

OIL-FILLED ELECTRICAL EQUIPMENT. Oil used for cooling, insulating and arc-quenching purposes in electrical equipment such as transformers, circuit breakers, switches, and voltage regulators presents one of the most serious fire hazards in the electrical industry. The use of non-flammable insulating liquids in transformers, such as askarel, inerteen, or chlorextol, minimizes this hazard. However, other problems limit their use, and they are not used to the extent desirable from a fire hazard standpoint.

Oil-filled equipment may contain from several gallons of liquid to approximately 10 thousand gallons in large transformers. The oil itself has a relatively high flash point of about 280 F.; but once ignited, burns readily. Under conditions prevailing in a transformer or other oil-filled equipment, pressures are created inside the casings when the oil is vaporized by arcing underneath the oil surface. The arc may at the same time burn a hole in the casing and permit hot burning oil to squirt out, spreading fire over the adjacent area. If the transformer is not enclosed in a fire resistive vault, or protected by proper barrier walls, or is not protected with an automatic extinguishing system, results may be disastrous.

A serious electrical fire began in

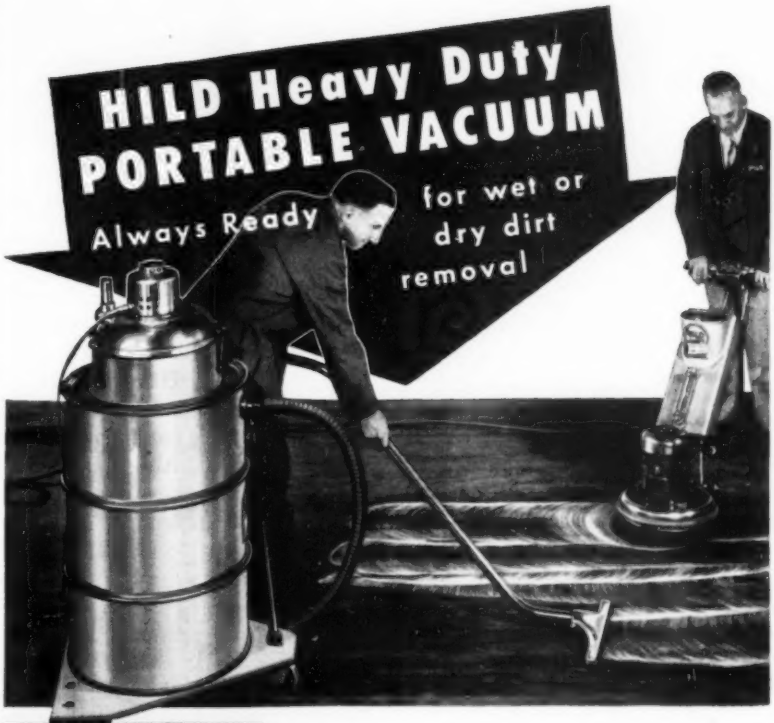
BE FRESH...
STAY FRESH
wear a
DUPOR No. 1
miniature NOSE MASK for
Dust, Fumes, Paint Spray
Has 9 sq. in. filter. Mask is of soft rubber equipped with nose wire that's adjustable to any shape nose. Exhalation valve exhausts breathed air and keeps out unfiltered air. Handy as a pair of glasses. Complete panorama vision, no blind spots. Does not interfere with talking, eating, smoking. Fits the vest pocket. Weighs 1 oz.
Sample sent $1.20 pp
For the best in eye protection get H. S. Cover's Gas-Tight, Fog-Proof Goggles.. $2.00 pp.
H. S. COVER, South Bend, Ind.
(For further details, use Key # J-38 on free Inquiry Card on page 81)

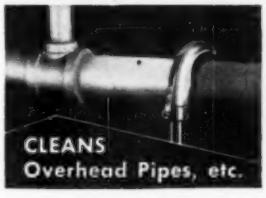
just this manner. Failure occurred in the primary winding of a 3 KV water-cooled, inert-gas, pressure-type transformer located inside a substation, but not isolated from the rest of the building. The winding shorted on the case and burned a hole about 1¼ inches in diameter. Oil ignited and squirted out, spreading fire and smoke throughout the building, causing extensive damage to two 4 KV buses, as well as switch gear, and cracking the bushings on an adjacent 3 KV transformer. Minor damage was done to other equipment in the building. After all electrical equipment was dead, the fire department required 2 hours to extinguish the blaze, using hose streams and spray nozzles. Approximately 1500 gallons of oil was involved in the fire. Damage amounted to approximately 100,000 dollars.

Extinguishing Agents

In fighting fires in electrical equipment, the primary function of the extinguishing agent is not to extinguish the electrical spark, flash or arc, but to extinguish the material in or around the equipment that is burning. These materials may be oils, greases, solvents, insulation and oil-saturated lint or waste. If the current is shut off before fighting the fire, any agent suitable for the materials involved would be satisfactory. However, since it is not always feasible to shut off the current and to avoid the possibility of errors, the equipment should be treated as if alive. Extinguishing agents used on electrical equipment should be non-conductors of electricity, so as not to endanger the user, or damage other electrical equipment.

Hand extinguishers for use on electrical fires are listed by Underwriters' Laboratories, Inc., and this suitability is indicated by the letter "C" etched or embossed on the U. L. label or manifest. To be eligible for the "C" classification, extinguishers must not only be capable of extinguishing incipient fires in and around electrical equipment, but must also be safe for use on high voltage equipment.





For scores of plant clean-up jobs the HILD vacuum is a real work-saver...a time-and-money-saver! Numerous attachments equip this unit to do all the jobs pictured here and many more...like cleaning stock bins, machine tools, castings, beams, ceilings, etc.

There are no adjustments to make...no filter to change when switching to wet pick-up work. Moisture in the vacuum air-stream cannot damage the special HILD Bi-Pass motor. Synthetic rubber vacuum hose and caster tires resist oil and grease. For easy portability the unit is mounted on a sturdy steel dolly with ball-bearing casters. The tank holds 40 gallons of recovered liquid. A 2-inch gate valve permits easy emptying into a drain or gutter.

HILD System
MAINTENANCE
EQUIPMENT & SUPPLIES

Write for FREE circular

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740 W. Washington Blvd.,
Dept. SMP-9, Chicago 6, Ill.

FACTORY BRANCHES:
250 E. 43rd St., New York 17, N. Y.
4271 W. Third St., Los Angeles 5, Cal.

(For further details, use Key # J-39 on free Inquiry Card on page 81)

Let's consider the agents available for combatting electrical fires:

1. Water. Information and misinformation has been published regarding the use of water on high and low voltage live electrical equipment. Properly used, water is an excellent agent for extinguishing electrical fires, especially large ones. Its cooling effect prevents rekindling of the fire once it is extinguished. In the form of a spray or fog applied by fixed systems, it is the most widely used method of protecting outdoor transformers.

Fire experts consider there is little danger in directing hose streams on wires of less than 600 volts to ground from the distances likely to be met under ordinary fire fighting conditions.

Tests in which streams from various types of hand extinguishers were directed on a metal plate charged at

550 volts, A.C. to ground, showed that beyond 6 feet, no current was conducted by the stream. The same tests, made on 550 volt switchboard panels having live bus-bars and cut-outs, showed that foam and water containing antifreeze caused sufficient arcing to blow the fuses.

Other tests, using 2½ gallon hand pump and CO_2 cartridge water extinguishers with both city and river water showed that at distances of 2 feet or more from voltages of 8,000 volts (to ground) or less, leaking current was one milliampere or less.

Further tests established recommended minimum distances between certain types of fixed spray nozzles on hose lines and live electrical equipment. These distances, including a factor of safety of 7, vary from 4 feet at a phase to phase voltage of 33,000 volts to 14 feet at a phase to phase voltage of 222,000 volts.

Water pressure used in determining the spans was 200 psi, although the nozzles operated successfully at pressures down to 20 psi. Performance was better at the higher pressures. Resistivity of the river water used varied but remained in excess of 650 ohms per cubic inch. Normal hydrant water can have a resistivity of approximately 1,500 ohms per cubic inch.

These tests established that non-adjustable fixed type spray nozzles that effectively break up the water stream should be used in applying water to live electrical equipment. They should be checked by measuring the electrical conductivity of the sprays produced. Also, it is necessary to limit the amount of water draining off the equipment so solid streams will not develop and possibly short circuit insulators and air gaps. Where nozzles are permanently mounted on grounded water pipe and where human beings are not involved, greater risks can be taken and therefore, smaller safety factors can be used.

In another series of tests, results showed that certain fog nozzles, when set for fog, are safe to use at distances of 6 feet or more from potentials of 120,000 volts (to ground) at pressures of 50 psi or more.

The use of fixed fog nozzles on hoses for use around energized high voltage equipment is advocated, but it is recommended that the nozzle be grounded in a satisfactory manner. A flat copper braid, equivalent to one #12 copper wire size embedded in the hose and connected to the brass hose couplings has been considered and used. Should a "solid" stream be used in error, tests indicate the ground conductor will protect a man from injury on voltage up to 120 KV to ground with the 2½ inch nozzle not less than 6 feet away from the energized conductor.

Tables for fixed water spray systems in NBFU pamphlet #15 give minimum distances of 6 feet at 7,500 volts to 12 feet at 220,000 volts.

When examining and interpreting conclusions of any tests made on the use of water for extinguishing electrical fires, it must be remembered that the tests are specific for a given set of conditions and extreme care must be exercised in applying them generally. Also, there are many other factors to consider beyond the conductivity of the water stream, or spray, under test conditions. As a general rule, water should never be directed on live electrical equipment or used unnecessarily where other means are available, except through the use of fixed systems.

2. Carbon Dioxide, within its limitations, is an excellent agent for use on electrical fires. It is the agent generally preferred because it has excellent dielectric properties, does no damage to equipment, and leaves no residue or deposits to clean up since the CO_2 liquid converts to a gas when the extinguisher is discharged. Being a gas, it will disperse into small openings and achieve extinguishment in what might ordinarily be considered inaccessible spaces. It is widely used for automatic protection of indoor transformer vaults, generators, and locations where the equipment is either

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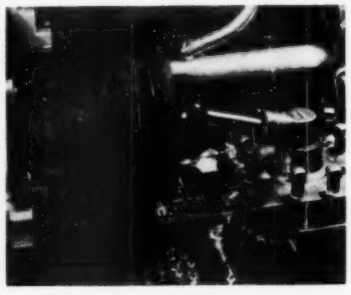

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Refer to page 433—1952-53 Edition Best's Safety and Maintenance Directory

(Use Key # J-41 on Inquiry Card on page 81)

enclosed or can be automatically sealed off. It also finds wide application in portable extinguishers around switchboards and electrical equipment. It is excellent around relays and other delicate electrical equipment. Tests indicate that CO_2 can be applied 10 inches away from a 100,000 volt potential without danger to the operator.

The disadvantage of CO_2 is that the effectiveness is decreased and can even be severely impaired by a wind or draft condition which blows away the inert gas blanket. When used on deep seated fires or on equipment that has become heated to a high temperature, there is danger of extinguishment being transient; and the fire rekindling after the gas had dissipated. There may also be delay in getting CO_2 equipment recharged.

3. Dry Chemical in the form of treated sodium bicarbonate, is recognized as one of the better agents for extinguishing flammable liquid fires. It is also excellent for electrical fires. Hand units are available in sizes up to 30 pounds. Experiments on automatic systems for electrical equipment are being carried out by extinguisher manufacturers.

Flashover tests on strings of suspension insulators sprayed with dry chemical under both dry and wet conditions showed dry chemical to perform well at voltages up to and including 120 KV.

The disadvantage of this agent is that the fine powder disperses during discharge and as a result requires a cleanup operation. The powder may also deposit on relays or other sensitive contacts and hamper the operation. There is also a controversy about the abrasive action of the powder on open bearings.

4. Vaporizing Liquid is popularly thought of as a carbon tetrachloride-base liquid which vaporizes in contact with heat and forms a heavy inert gas that blankets the fire. Actually other and newer types of vaporizing liquids have been developed, such as chlorobromomethane, dibromodifluoromethane, and bromotrifluoromethane. All these liquids have high dielectric properties in their pure state.

Vaporizing liquid from hand units can be used at fairly long ranges. The liquid has some "wetting" action when used on waste or lint saturated with oil or other fuels, and may achieve a more positive extinguishment of small fires, leaving no glowing, which may remain after use of carbon dioxide or dry powder. The liquid also may have more penetrating power when used on motor windings and the like. The main disadvantage of vaporizing liquid is that the fumes and decomposition products are toxic, and can be injurious or even fatal on extended exposure. Although this condition is unlikely, because the obnoxious nature of the fumes acts as a safety feature and drives one from the room before they can take effect, it is inadvisable to use such extinguishers, except under conditions of good ventilation. There is also objection to the dense black fumes formed, which can reduce visibility and hamper extinguishment.

The application and use of these agents require trained personnel for maximum efficiency. Good periodic inspections of fixed systems, established routines by civic fire departments and plant fire brigades, particularly with respect to cutting off of electrical service in fire emergencies, and employee training in the use of first-aid fire appliances will effectively reduce fire losses originating from electrical equipment.

An article on class A and B fires will appear in next month's issue of Safety Maintenance and Production.

For detailed descriptions of electrical fire prevention equipment see pages 24-70 of "Best's Safety and Maintenance Directory" 1952-53 edition.

Chart by courtesy of Underwriter's Laboratories, Inc. Pictures 1 and 2 by courtesy of Commonwealth Edison Company. Picture 3 by courtesy of Detroit Edison Company.

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(Use Key # J-44 on Inquiry Card on page 81)

Fire Protection in Malt Drying

"GREEN MALT" drying is a critical operation involving accurate measurement of temperature. Although a fairly high temperature is essential, the grain should not be heated excessively nor at too rapid a rate or "steeliness" and low quality will result. Desirable close temperature control is achieved through the use of a variety of electronic instruments.

During malt drying operations kiln temperatures are accurately recorded by a multi-point strip chart electronic instrument. This instrument is conveniently located in a central area of the drying floor. The thermocouples, made of copper constantan, hang in strategic locations in the mixing area of the large kiln. Thermocouple wire runs along the bottom of the kiln to these positions. Eight thermocouples are used to measure the drying process. This is due to the fact that the heat is not evenly distributed in the kiln because of the constantly varying moisture content of the drying malt, plus the speed and number of fans operating. Individual gas fires are adjusted, however, to attain an even temperature on the kiln. Agitators keep the grain from matting as large quantities of heated air pass through the grain.

The ever-present hazard of explosion in kiln operations has been reduced at the Northwestern Malt & Grain Co., in Chicago. Here the installation of 22 units protects against gas pilot flame failure. In case of flame failure, the relay automatically shuts off flow of gas to the pilot. The unit operates on the "flame rectification" principle. Pressure of fuel oil and gas in this plant's boiler room is regulated by means of another electronic unit. This is a non-indicating electric controller employing a bronze bellows measuring system which actuates a mercury switch in response to changes in the oil pressure. This controller gives two-position control.

Many malting firms use instrumentation to protect against explosion and fire. Such variables as kiln temperature and process steam pressure are carefully measured and controlled, and combustion safeguard equipment is used to protect plant and personnel against explosion and other operational hazards.

New NBFU Fire Code

THE National Board of Fire Underwriters announces publication of its newly-revised model Fire Prevention Code.

The code provides for safeguards against fire hazards and explosion from storage, handling and use of flammable liquids and gases, hazardous chemicals and explosives, plastics, dusts and fumigants. It provides as well for safeguards against conditions hazardous to life and property in the use or occupancy of buildings or premises, such as garages, bowling alleys, junk yards and places of assembly.

Everett W. Fowler, director of NBFU's division of codes and standards, supervised the compilation of the code. He explains that it is a revision of the board's "Suggested Fire Prevention Ordinance," which was first published in 1930.

Mr. Fowler points out that several new sections have been added to meet the needs and requirements of municipalities. In addition, he adds that there is published in the new code book a suggested ordinance providing for the establishment of a bureau of fire prevention and for the adoption of the code by reference. "Adoption by reference," he explains, is a means which has been used by many cities throughout the country in adopting the code.

Copies of the new Fire Prevention Code may be obtained free by persons having an interest in the code as well as by committees considering local codes. Copies will be supplied on request to the board at 85 John Street, New York 38. If you live in the Middle West, write to 222 West Adams Street, Chicago 6, and, if west of the Rockies, write to 465 California Street, San Francisco 4, California.

How to CONTROL Farm Fires!

SUDDEN fire is one of the most frightening situations which can confront rural areas. The treacherous progress of an uncontrolled flame is difficult to imagine. One small spark—an unwatched match flame—or the latent smoldering of spontaneous combustion can cause a major fire.

Every fire, however, starts as a small flame; and, if it could be extinguished during the first few minutes, there would be no need for the costly fire department which most communities are now forced to maintain.

Preplanning by some responsible group can determine the best course of action to follow when fire strikes. For instance, the simple expedient of carrying a portable fire extinguisher in the family automobile may save the car from being badly damaged by fire some day. Preplanning, for the fire protection of the home or farm may be broken down into 5 basic steps.

Proper Maintenance

Certainly, the most important consideration toward preventing fire, is proper maintenance and orderliness.

Putting things in order and cleaning up requires a fair expenditure of time, but it pays big dividends in the protection of property. Rags, solvents, paint, and other combustibles should be adequately stored. Oily rags have been the cause of many fires which probably could have been avoided by the use of standard oily waste cans. Although solvents are not usually the cause of a fire, they can contribute to its tremendous acceleration because of their highly flammable nature. They should be adequately stored in fire resistant surroundings.

Fire Departments

If there is a fire department within working distance of a farm, discuss with them the elimination of fire hazards and the methods of fire protection for the farm area. If a small pond is available for water supply, tell them where it's located. Let them know where gasoline or other flammable liquids are stored. Tell them about usually locked doors, and the number of persons in the immediate household.

Neighbors

Neighbors can be a real help in the fire protection of a farm. But they can be of only partial help unless plans are made. There should be a trading of important information. For example, have it arranged so someone in the household can call a neighbor in the event of a fire.

He will in turn relay the information to others.

Use a code-word system. Talk and explanations are time-consuming when a fire is underway. The first 5 minutes of a fire may determine whether it will be readily controlled, or will result in heavy loss.

If a neighbor has a pump and hose which could be used in fire fighting, make arrangements for him to bring it. Perhaps, another neighbor has a light alumium ladder for easier carrying; arrange for him to bring it. Plan beforehand, so each farmer will be of greatest help to the friend in trouble.

Alarm Systems

The heat-actuated fire alarm is a device well suited to use on the farm. Alarms of this type are available from fire protection supply companies, and are rated by approval agencies, such as Underwriters' Laboratories and Factory Mutual's Laboratories. The fixed-temperature mechanism operates at a predetermined temperature, depending upon the hazard to be protected. Ordinarily, this temperature is 165 degrees F. However, there are some alarms that operate at 135 degrees F., 212 degrees F., and somewhat higher temperatures. These devices are usually thermostatic, that is, a strip of metal expands when heated and bends to actuate the alarm system. Other types of fire alarm units depend upon a photo-electric cell principle, and some operate on the basis of a rate-of-rise in temperature.

Two important facts must be kept in mind in considering an alarm system. 1) The system must be properly maintained in good working order at all times. 2) The bell or other warning signal must be placed so it will arouse someone to quick action. *The essential factor at the time of a fire is speed.* With an adequate alarm system, many minutes of valuable time can be saved. This factor may be the difference between controlling the fire or finding it out of hand.

Fire Protection Equipment

A properly placed fire extinguisher, or fire bucket, can do a lot toward maintaining an adequate fire protection system for the farm. Portable extinguishers are classified by the Underwriters' Laboratories according to the type of fire they are designed to extinguish.

Class A Fires—Extinguishers of this classification make use of agents capable of extinguishing fires in such materials as wood, paper and rags.

Class B Fires—Fires involving gasoline, fuel oil, or other combustible liquids are extinguished by the Class B type unit.

Class C Fires—The extinguishing agent in this instance must be a non-conductor of electricity, as the extinguisher is used on electrical fires.

A fourth classification, now recognized by some fire fighting groups (Class D) involves fires in trucks, tractors and similar equipment. A given type of extinguisher may be approved for one or more classes of fires; for instance, foam extinguishers are used on both Class A and B fires.

For the most part, farm fires involve Class A material (wood, paper, clothing, etc.) which can be extinguished by using water. For this purpose, the reliable water bucket should not be overlooked. It is inexpensive and many can be placed strategically about farm buildings; the contents then may be used to put out a fire on quick notice.

For fires which must be fought from a distance, pump type extinguishers, pressure cartridge operated extinguishers and soda acid extinguishers are efficient. As the name implies, the pump type unit is used by manually operating the small pump fastened to the extinguisher. Soda acid extinguishers are usually operated by being inverted. The upending of the extinguisher mixes a

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solution of sodium bicarbonate and a small amount of acid. Carbon dioxide gas liberated in the reaction expels the 2 and a half gallons of water from the extinguisher, under pressure. Both units will throw a stream of water about 35 feet. The soda-acid extinguisher has the advantage of greater mobility, whereas the pump type extinguisher can be easily refilled while in continuous operation.

Sodium bicarbonate is one of the most versatile of fire fighting chemicals. In addition to its use as a pressure-generating solution in soda-acid and foam extinguishers, it is extensively used in the dry form as an extinguishing agent. One such patented application is the dusting of hay with specially treated sodium bicarbonate to retard spontaneous combustion.

Protecting Extinguishers

A very important fact to remember in working with water-type extinguishers is that they must be protected during cold weather from freezing temperatures. Soda acid extinguishers should be placed in areas where the temperature does not go below freezing. Water buckets and pump-type extinguishers, as well as cartridge operated extinguishers, can be stationed in areas where the temperature drops as low as 50 degrees below zero F. by using solutions of calcium chloride instead of plain water.

Calcium chloride effectively reduces the freezing point of its water solutions. For instance, using 4 pounds per gallon of mixed solution, the freezing point of water will be lowered to 53 degrees F. below zero. This is 85 degrees below the normal freezing temperature of water. Naturally, it is not often necessary to protect to this low temperature, and usually less calcium chloride will be needed. However, the relationship between calcium chloride and freezing point depression is not as direct as we may expect. Two pounds of calcium chloride per gallon of solution (one-half of that required to reach 53 degrees F. below zero) will only protect to 10 degrees F. above zero.

It is important to use sufficient calcium chloride to protect equipment to the lowest winter temperature that may be expected. But do not use more calcium chloride than the maximum recommended amount, as this will cause the freezing point to rise and crystallization of the chloride may occur. Consult the chart on calcium chloride usage as an aid in choosing the correct amount. For your convenience, fire extinguisher manufacturers have specially prepared calcium chloride charges available in standard sizes.

Calcium chloride imparts other desirable properties to its solutions, preventing stagnation and reducing evaporation of the water. Mosquitoes will not breed on water containing calcium chloride, nor will the solution become foul by the growth of algae and other scum forming plants. Evaporation is retarded sufficiently, so that less attention is required to maintain an adequate water level. These facts about dissolving calcium chloride may also be helpful. Always add the calcium chloride to the water slowly, while stirring the solution. Pouring water on calcium chloride usually results in a lumping of the chloride, making it rather difficult to dissolve.

The following amounts of calcium chloride have been recommended for use in portable fire extinguishers, pails and barrels:

Pounds of 77–80% Flake Calcium Chloride		
Per Gal. of Water	Per Gal of Solution	Freezing Point °F.
1.0	.96	24
1.5	1.4	19
2.0	1.8	13
2.5	2.2	6
3.0	2.6	— 2
3.5	3.0	—12
4.0	3.4	—22
4.5	3.7	—33
5.0	4.0	—53

Calcium chloride should never be used in a soda acid type extinguisher,

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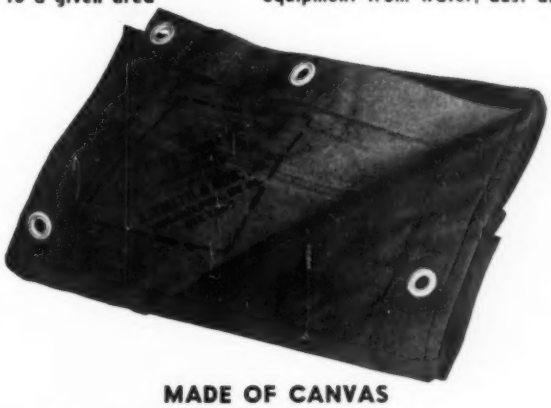

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as it may make the unit inoperative, because of the chemical reaction brought about by the mixture.

Other extinguishers, which are used primarily for Class B and Class C fires, include vaporizing liquid, carbon dioxide, and dry-chemical type fire extinguishers. The 1½ quart type vaporizing liquid extinguisher can be used to good advantage around automotive equipment, such as electric motors, generators and wiring.

The relatively new dry chemical type extinguisher is an extremely efficient unit for the extinguishment of Class B fires (gasoline, fuel oil, oils and greases). Operated by pressure from an attached cartridge, the dry chemical is expelled as a cloud of white powder, which absorbs heat and engulfs the flame with fire smothering carbon dioxide gas.

Further farm fire safety help in the form of small booklets may be obtained by writing the following agencies: (1) United States Chamber of Commerce, (2) United States Department of Agriculture, (3) United States Office of Civilian Defense, (4) National Board of Fire Underwriters, (5) National Fire Protection Association and (6) The Calcium Chloride Institute.

For detailed descriptions of fire extinguishers see pages 24–50 of "Best's Safety & Maintenance Directory," 1952–53 edition.

Eisenhower Proclaims Fire Prevention Week

PRESIDENT EISENHOWER called on the Chamber of Commerce of the United States, the National Fire Waste Council and other organizations today to wage a crusade against fires which have cost the nation $1 billion and 10,000 lives in the past year.

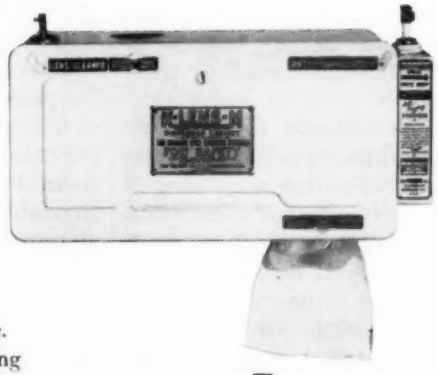
The President, in proclaiming October 4–10 as Fire Prevention Week, said "it has been abundantly demonstrated that fire losses can be substantially reduced wherever people are awakened to the danger."

The National Chamber, through its affiliated organization, the National Fire Waste Council, again is taking a leading role in planning nationwide observance of Fire Prevention Week.

The program will include community fire prevention education, fire-fighting demonstrations, and inspections of local fire department facilities, industrial plants, commercial buildings, homes and schools.

The bulk of the work for Fire Prevention Week will be carried on by the 37 national organizations affiliated with the National Fire Waste Council and the more than 1,300 fire prevention committees of local chambers of commerce.

STOP Eye-Strain Fatigue



Eliminate scratched, blurry, dirty goggles, glasses, face shields . . . and help your employees stop eye-strain fatigue. The K-LENS-M Liquid Method of cleaning and anti-fogging gives cleaner, clearer vision for both glass and plastic eye-wear. K-LENS-M Lens Cleaner and K-LENS-M Anti-Fogging Liquid work better and last longer . . . for lowest cost per cleaning. Complete service in a compact Dispensing Station . . . easy to install, use and service.

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For demonstration, visit Booth 58, National Safety Congress, October 19–23, Chicago.

(For further details, use Key # J-48 on free Inquiry Card on page 81)

What's New . . .

For your convenience in obtaining descriptive literature of products listed here, use the Reader's Inquiry Card. Just write in the code number given with each item. Or send written requests to:

Service Dept.,
SAFETY MAINTENANCE & PRODUCTION

PLASTIC PROTECTIVE SUIT

(Use Key # 817 on Inquiry Card on page 81)

THE suit shown in the photograph below has been developed by the Dayton Safety Supply Company. Designed with heavy gauge plastic it can be used around strong acids, caustics, etc. Air is supplied

from an outside source, entering in the front and being exhausted from the suit at the top of the head. The air circulates inside the suit to provide adequate ventilation for the wearer. Heavy gauge material gives greater abrasion resistance. Two exhaust valves control the air flow, and effectively cool the wearer who would otherwise be very warm, since plastic film allows no air to circulate through it.

LIQUID SYNTHETIC DETERGENT

(Use Key # 818 on Inquiry Card on page 81)

FOR cleaning all surfaces: resilient and hard floors, walls, woodwork, windows, tile, porcelain, stone, plastic, asphalt tile and mastic, and rubber, as well as for stripping water-emulsion wax off floors, a liquid synthetic detergent, called Cindet, has been developed by the C. B. Dolge Company. As illustrated in the photograph above, the detergent completely dissolves even in hard water. It is described as easy to wash off without leaving the surface dull or dingy. It is economical, since it requires only 1 part to 30 parts of water

for most cleaning operations. Allowed to stand 5 to 10 minutes before applying, the detergent can be applied with a clean mop on floors and a cloth on vertical surfaces. In severe soaking tests it showed little effect on asphalt tile and mastic. A special feature is the ease and thoroughness with which it removes rubber marks on sealed floors. It can be rinsed off with clean water. A storage advantage is that its freezing point is 8 degrees below that of water. In addition it does not lose its appearance or performance qualities even if frozen. On thawing out it performs exactly as before.

COLLAPSIBLE COT

(Use Key # 819 on Inquiry Card on page 81)

FOR quick, comfortable moving of injured persons the Emergency Aids Company has designed a versatile stretcher. Weighing 23 lbs., the cot doubles as a transfer chair, wheeled or flat stretcher. It is stored folded flat against a surface. From 45"x0"x2¼" dimensions folded it can be opened to 72"x20" and stands 8" from the floor. Called Collapsi-Cot, the litter has a patented back rest feature which can be set at different angles to fit the patient. Particularly valuable in moving cardiac cases, the stretcher can be wheeled wheel-barrow fashion by one person. The cot is simple to set up, reportedly in 10 seconds. It is built to be used easily in narrow corridors and doorways as well as on winding stairs. Containers for various ways of storing the litter are available. The stretcher comes equipped with detachable waterproof pillow, canvas cover and 2 restrainer straps.

TIRE REMOVING TOOL

(Use Key # 820 on Inquiry Card on page 81)

A TOOL to make easy the removing of a large (20 or 22 inch) tire from its wheel or rim is announced by Louisa Farm Implement Repair. It may also be used to hold the tire and wheel in such a manner as to make the tire inflation absolutely safe for the operator, by eliminating the danger of the locking ring exploding. The device is stoutly constructed of especially prepared formed steel shapes, electrically welded into place to form a rugged machine which does its job while occupying a minimum of space in the shop, or on the service truck. It requires little or no maintenance.

HEAT RESISTANT GOGGLES

(Use Key # 821 on Inquiry Card on page 81)

A SERIES of features for goggles to be worn on jobs where there is extreme heat has been developed by American Optical Safety Products Division.

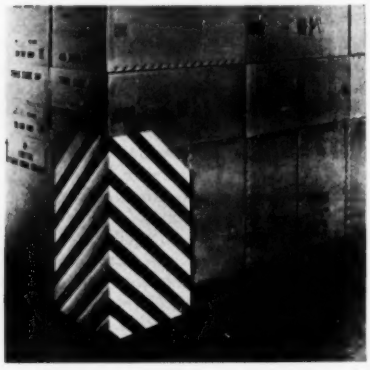
Non-toxic, heat resistant and perspiration-proof vinyl binding on side shields, eye binders and bridges is more comfortable and lasts longer than leather. Permanently stitched on eye binders and bridges and heat-sealed on side shields, these vinyl-clad metal goggles can be washed or sterilized as often as necessary.

On special order, these features can now be obtained built into AO Goggles 4145, 4149, 101-45.8, 101-50 and 3039-50.

INSECT EXTERMINATOR LAMP

(Use Key # 822 on Inquiry Card on page 81)

INSECT lamps commonly discourage the pests from approaching the light by being less attracted to it, but the Solar Electric Corporation is now producing an insect lamp that actually destroys them within an area of 15,000 cubic feet. Spraying is unnecessary as the Solar Insect Exterminator Lamp silently and automatically vaporizes Lindane (gamma isomer of benzene hexachloride). This vapor positively destroys not only flies, but also moths, ants, mosquitoes, fleas, cockroaches, spiders, wasps, etc. The vapor is odorless and harmless to humans. To operate, the lamp is simply screwed upright into an ordinary light socket, and a pellet or two is dropped into a special depression at the top of the lamp. It glows in operation, but cannot overheat, as the vapors are released at the government specified rate of one gram per 24 hours.



PALLET CORNER GUARD

(Use Key # 823 on Inquiry Card on page 81)

THE volume manufacture of a new materials handling safety device, called the Ran-Guard Corner Steel Pallet Guard, has been begun by Randolph Metal Products Co. The new all-steel pallet guard protects warehouses and plant loads from traffic damage at every corner. Welded steel gusset slips under the load (either on the floor or beneath pallet) and prevents the bright yellow and black guard from falling. The guard was originally developed as an experimental device to protect the company's own material against damage by trucks and lifts. The guard can be adapted to all types of storage—on skids, pallets, floor, etc.

ANTISEPTIC SOAP

(Use Key # 824 on Inquiry Card on page 81)

A NEW non-irritating medicated soap that is said to have maximum antiseptic and germicidal value is announced by The Gerson-Stewart Corporation. Known as Softasilk with Actamer, this soap has proven to greatly reduce the hazard of infection in institutions, schools and industry. Its daily use practically eliminates all common bacteria from the surface and pores of the skin. It is especially beneficial in the prevention of contamination during food preparation. The soap's extremely low toxicity, unexcelled ability to clear the skin of bacterial contamination and its economical price make it ideal for general usage. The manufacturer states that case studies prove the soap reduces resident flora of the skin by 97.4%. Irritation and sensitization studies indicate that it can be applied repeatedly with no danger to the skin. The glycerine content of the original oils is present in the finished soap and serves as an emollient, soothing to the skin. Another reason for lack of irritation is the unique buffer ingredient which absorbs the alkali released as the soap hydrolyzes in contact with water. The soap shows no significant changes in color, odor, consistency or antimicrobial activity after storage for one year at 50° C.

VEHICLE-DOCK ADJUSTER

(Use Key # 825 on Inquiry Card on page 81)

A DEVICE designed to raise or lower over-the-road carriers to dock height, has been introduced by Rowe Methods Inc. Called the Adjust-a-Truck, it is designed for firms which do not have adequate room on or in front of docks to install adjustable dock ramps. The unit is set into the pavement in front of the dock; and, by means of heavy duty electric hydraulic system, adjusts each vehicle to dock height. Its capacity is 40,000 lbs.

The deck has a surface of checkered plate carried on a framework of standard structural beams and channels, welded throughout. Deck size: 9'x12' long available; standard 10'x12' long. Cylinder assembly consists of a single-acting type cylinder. The piston rod is hard chrome plated to resist all weather conditions. A deep stuffing box contains chevron-type packing retained by a deep brass gland, with an efficient wiper to prevent entrance of dirt. A ball and socket at the top and bottom of the cylinder assembly compensates for angular movement. A substantial bearing plate is furnished with the cylinder to distribute the load. Adjustment range is 18" and 24". Raising and lowering is instantaneous by double push-button. The unit is designed for a 110-volt circuit.

FIRE ALARM

(Use Key # 826 on Inquiry Card on page 81)

A NEW fully automatic fire alarm that is on continuous duty 24 hours a day is the product of the R. J. Schuler Associates. Called Firealarm, the device gives a loud, penetrating warning when temperature reaches the danger point. The unit

is compact and attractive—no installation required. Simply hang it on the wall near any fire hazard and plug into any convenient 110–120V A. C. outlet. It requires no maintenance and does not use any current except when set off by flames or excessive heat. Then, when fire is extinguished, the alarm automatically resets itself and is again operating. This new electric warning device is recommended by insurance underwriters and fire officials.

BURN TREATMENT

(Use Key # 827 on Inquiry Card on page 81)

AN AEROSOL treatment for minor burns, Alke-Mist, has been developed by Drug Products Corp. of America. It utilizes freon as a propellant, and contains a germicide in the form of Benzalkonium Chloride mixed with a bland vegetable oil base. The treatment is said to be a safe and reliable germicide in concentrations of not more than 1 to 1,000 and has a high phenol co-efficient in dilutions as high as 1:30,000 against most pathogenic bacteria.

There is no need to touch a burned area of the skin, since the aerosol operation applies a thin mist of the treatment over the burned area.

A simple valve sends out a fine spray and quickly relieves burned areas. It is suited for first-aid stations in industry, and for placing adjacent to fire extinguishers and other safety apparatus. The product is being used, in addition to its curative value on minor industrial type burns, as a quick treatment for windburn and sunburn.

INSECT SPRAY

(Use Key # 828 on Inquiry Card on page 81)

A NEW type, fast-acting insect spray in an aerosol container is now available from Huntington Laboratories, Inc. for use in schools, hospitals, hotels, restaurants, offices, homes, factories, food processing plants, etc. Tests have shown the effectiveness of Secti-San Aerosol Insecticide as a quick and positive killer of all moths, flies, roaches, silver fish, fleas, mosquitoes and other crawling and flying insects . . . including their eggs and larvae. The insecticide comes ready-to-use in a throw-away can. Pressure on a plastic squeeze-cap instantly releases the non-toxic, non-corrosive mildly perfumed mist throughout the room. Formulated to destroy-on-contact the insects commonly found in public buildings, active ingredients include allethrin, pyrethrins, piperonyl butoxide and methoxychlor. It contains no D.D.T.

COVER GOGGLE

(Use Key # 829 on Inquiry Card on page 81)

A NEW goggle for wear over prescription glasses is announced by Willson Products, Inc. Known as the Kover-Mor style, the new goggle provides a comfortable fit with ample clearance over modern, large-frame prescription glasses. Two versions are offered—a chipping style, with clear, heat-treated glass lenses; and a welding goggle, with choice of filter lens shades. Molded nylon eye cups are an outstanding feature of the new goggle.

Standard 50mm. round lenses are used in both chipping and welding versions, eliminating the need for users stocking odd-size replacement lenses. External lens retaining rings make lens replacement quick and easy. A rigid metal top bar is standard on the goggles. This provides an adjustment to the individual user's face, and also makes the goggle easy to take off and on with one hand.

ELECTRIC TOOL TESTER

(Use Key # 830 on Inquiry Card on page 81)

A NEW device known as the Pow-R-Safe Tool-Tester, which is said to quickly and accurately detect electrical defects in electric hand tools and extension cords has been introduced by the Fendall Company. The safe working condition of such electric hand tools as drills, screw-drivers, nut-runners, saws, grinders, sanders, soldering irons, together with cords, can be determined quickly by simple finger-tip controls.

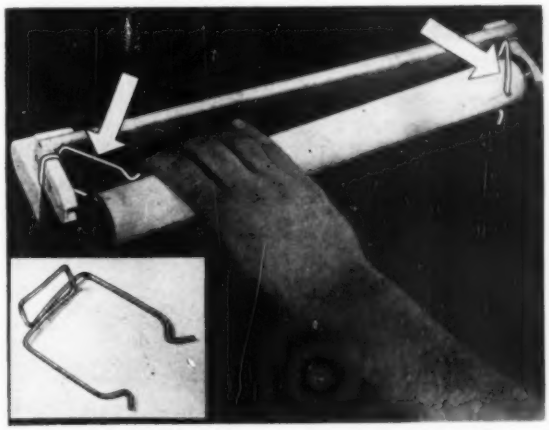
By simply pressing buttons, familiar red and green lights flash to indicate the following conditions: proper equipment ground as safe; open equipment ground as unsafe; power ground as unsafe; short circuit as unsafe; good tool switched and extension cord as safe; defective or shorted tool switch or extension cord as unsafe; whether or not tool is in proper mechanical running condition.

HEAT RESISTANT SUIT

(Use Key # 831 on Inquiry Card on page 81)

THIS suit saves hours of cylinder production time and guards against spoiled "heats" at a Walter Kidde & Company Inc. plant. Used in conjunction with a large gas furnace which continuously heat treats and degreases fire extinguisher cylinders, the outfit permits a man to work comfortably between the 2 tunnels of the furnace and to make necessary adjustments to it at temperatures up to 400° F.

for as long as 45 minutes. Formerly, when furnace controls needed adjustment, the furnace was secured and took 2 days to cool sufficiently for men to enter the control area and work for a maximum of 30 seconds. Now, production continues uninterrupted during adjustments and the worker is not subjected to extreme heats or carbon monoxide gas. The rig was developed jointly by the company's safety department and a safety equipment dealer. It has 6 basic parts: hood, mask, suit, gloves, shoes, and air purifier. The suit and hood are made of a pliable, herringbone-type fabric coated with aluminum paint which reflects 90% of heat. The gloves resist heat to 1600° F. and the shoes are of asbestos. Fresh air is supplied by an air purifier and pressure reducer connected into the plant's compressed air line. Parts from Guardian Safety Equipment Co.



LAMP GUIDE-GUARD

(Use Key # 832 on Inquiry Card on page 81)

A NEW, inexpensive slip-on guard is announced by the Gets-A-Lite Company, which prevents fluorescent lamps from falling from their sockets, despite heavy vibration or spreading of the fixtures. Called the Gets-A-Lite Guard And Guide, this device is constructed of spring wire, formed into the shape of a "U," with the sides 2¼" long, terminating into outward-pointing prongs the other end containing a small rectangle set at right angle. In use, the guards are merely slipped over the sockets at each end of the fixture and left there. No upkeep or adjusting is necessary. Installation is accomplished quickly and once installed (which anyone can do without tools) the device is never removed, even during the process of changing lamps. Particular attention is called to the manner and effectiveness in which this device serves as a guide in addition to being a guard, actually steering the lamp into its socket, thus making replacement of lamps over running machinery, in glass show cases, on high ceilings and in other inaccessible places, easy and safe.

PIPE-CLEANING MACHINE

(Use Key # 833 on Inquiry Card on page 81)

MAINTENANCE problems involving the opening of clogged industrial or sanitary drains and supply lines can be solved by the use of an electric pipe cleaner produced by the Kollmann Manufacturing Co. Offered with a variety of power units which include A.C. and D.C. electric, gasoline and compressed air, this sturdy, portable machine drives up to 200 feet of sectional cable through any combination of traps or bends in lines from 1¼" to 12". The 700 rpm cable speed assures complete clearing of any stoppage, while a patented, instant-acting clutch provides finger-tip starting, stopping or reversing. Fifteen-foot sectional cables assure safety, convenience and ease of handling. They are available in three diameters for varying pipe sizes. A guide hose encloses cable to end whipping or damage to surrounding areas. Fully portable, the machine can be carried and operated by one man and passed through openings as small as 14" x 22". Excellent for sanitary or industrial drains, concealed or exposed downspouts and underground or overhead supply lines, the cable can be fed through a guide pipe to clear tank storage lines without draining tanks. For service on lines up to 3" in diameter a lightweight machine is also available.

SLUDGE SOLVENT

(Use Key # 834 on Inquiry Card on page 81)

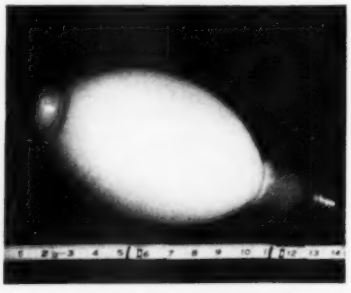
THE problem of removing heavy accumulations of tar-like sludge from fuel oil storage tanks is being attacked by "Houghto-Solv," a fuel oil additive manufactured by E. F. Houghton and Company. It is common for several inches of thick sludge to settle to the bottom of fuel oil tanks and impede the entire heating system. Cleaning is a time-consuming and expensive job, necessitating closing down the entire heating system. The new additive, used in the proportion of 1 quart to 1,000 gallons of oil attacks the sludge immediately and continues its action until the sludge is dissolved and as burnable as the fuel oil itself. The advantages claimed for the solvent are that it keeps the entire heating system clean and free of deposits, eliminates expensive maintenance, saves time in production plants and provides efficient and economical heating.

PUSH-BUTTON EXTINGUISHER

(Use Key # 835 on Inquiry Card on page 81)

A NEW push-button type fire extinguisher, discharging a vaporizing liquid in a 25-foot stream by compressed air, has been brought out by the Pyrene Manufacturing Company. The extinguisher is pint size and weighs 2½ lbs. filled. It is valuable for a fire emergency in shops and in vehicles as well as around the home. An all-purpose extinguisher, constructed of stainless-steel and plastic, it can be used against ordinary small fires as in shavings, gasoline and other flammable liquids, in wiring and power tools.

The stream can be played accurately on the fire by pointing the extinguisher and holding down the push-button. When the button is released, there is positive shut-off. Operating on air-pressure, the push-button extinguisher can be easily readied again for action. The head is removed, the shell filled with extinguisher liquid, the head replaced and the extinguisher recharged with air. Compressed air can be put in through the extinguisher nozzle from a hose line . . . right at the corner gas station if necessary. The shell is made to withstand many times the pressure in such lines.



FLUORESCENT MERCURY LAMP

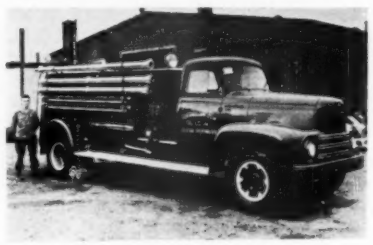
(Use Key # 836 on Inquiry Card on page 81)

TO MEET the trend toward larger manufacturing spaces, higher mountings and higher lighting levels both indoors and outdoors, Westinghouse Electric Corporation has made available a new 1000-watt fluorescent mercury lamp. This lamp provides a golden white light suitable for all types of lighting service except those where close color discrimination is involved. Its bulb has a specially developed isothermal shape that allows the phosphor coating to function at maximum efficiency. When activated by invisible ultraviolet light from the quartz arc, the phosphor gives off red light. This blends with the blue-green-white light from the mercury arc to give a golden white light with approximately the same color quality as a mixture of equal wattages of mercury and incandescent light. Inside frosting of the bulb provides better diffusion of light and greater uniformity of color.

FOAM FIRE TRUCK

(Use Key # 837 on Inquiry Card on page 81)

A NEW National Aer-O-Foam pumper truck, designed for use as a portable foam generating plant for fighting petroleum fires, has been built by National Foam System Inc. The mechanical foam is generated when the specific amount of foam liquid is proportioned into water, and the resulting solution is passed through pipes or hose to a foam maker. Air is induced at the foam maker, and the churning action of water, foam liquid 3 percent and air, produces a heavy, tough foam for use in blanketing and extinguishing flammable liquid fires. The powerful pumper



has a chassis with a 193" wheel base, dual rear wheels, and is equipped with a 372 cu. in. engine. The truck has a gross weight, completely loaded, of about 21,000 lbs. including a crew of 5 men. It is equipped with a two-stage centrifugal pump which operates directly from the driveshaft, and can discharge a torrent of foam at the rate of 6000 gallons of foam per minute at 150 psi. Actual motor throttling and discharge control of pump can be handled from either side of the truck at the running board control panel. Foam-making equipment available ranges from foam nozzles to portable foam towers. The towers are designed for the protection of tanks up to 35' in height. Constructed of aluminum, they are easy to carry, and simple to erect. The curved discharge tip, or "gooseneck," is stainless steel and is extremely resistant to heat. One tower is of sufficient size for use on intermediate or small tanks. Both towers can be used together to protect larger tanks. The large main tank of the pumper truck has a capacity of 500 gallons of foam liquid. It is fabricated of welded steel and equipped with baffles. Other equipment includes 1000 feet of 2½" hose, 500 feet of 1½" hose, portable spotlights, tools and miscellaneous aids. An interesting innovation is a "trouble button" located near the left rear handrail. If some emergency should develop at the rear of the truck, the button is pressed, and a red signal light flashes on the driver's instrument panel so that the truck can be halted.

FREE BULLETINS & CATALOGS

As a convenience to executives, these new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE & PRODUCTION. To obtain copies write in the key numbers on the free-postage card below.

FIRE PROTECTION

Fuel Tanks 533
American Safety Tank Co. Discussed in this 8-page, 2-color bulletin are safety fuel tanks for transport trucks. Cutaway drawings, illustrations and specifications cover the design features and accessory equipment needed for installation. Different sizes, models and types are carefully explained.

Breathing Equipment 534
Scott Aviation Corp. Central topic of this 4-page, 2-color brochure is an air-breathing device composed of mask, hose, air-filled cylinder and necessary regulating equipment. Designed for use by firemen, workers encountering fumes in confined spaces and maintenance men, the equipment can be carried by the user or attached to a separate air source.

Fire Extinguishment 535
Ansul Chemical Co. A file of literature on fire extinguishing, these bulletins contain many illustrations and diagrams in 30 pages on inspection and maintenance of fire extinguishers, types of fires and extinguishment and a line of fire extinguishers. A chart for inspection, specifications and details of extinguishers and methods of extinguishing are included.

ELECTRICAL EQUIPMENT & MAINTENANCE

Electrical Control Maintenance 536
Allis-Chalmers Mfg. Co. What to look for in maintaining electrical control equipment properly is told in this 8-page manual. Fully illustrated, the manual contains a check list of danger points and a control chart showing the symptom and possible cause and cure of the electrical failure.

Fuse Clip Clamps 537
Trico Fuse Mfg. Co. A 2-color folder discusses with diagrams and illustrations the use of clamps to hold fuse clips tightly to fuse. Other uses include temporary connections, cable splicing, temporary hangers, clamping switch jaws and clamping parts for soldering, drilling, welding, etc. Advantages claimed are stopping arcing, heating, wasted current, fuse blowings, etc.

Electrical Protective Devices 538
Multi-Amp Corp. A 12-page booklet, illustrated and charted, this literature describes in detail how to test current actuated protective devices, such as overload relays, circuit breakers, etc. Specifications and explanation of testing and calibrating device are included. Step by step instructions are outlined.

Electronic Controls 539
The Autotron Co. Described and illustrated in this literature are various electronic control devices including photo-electric counters electric counters, shadow switches, current change actuated counters, shadow counters and other types of electronic controls. Full specifications and operational details are given. Applications include punch presses, production lines, doorways, fire protection, etc.

HEALTH AND SANITATION

Salt Tablet Dispensers 540
Mine Safety Appliances Co. Salt tablet dispensers, both permanent and throw-away types, are described in this 2-page bulletin. Bakelite and translucent plastic permanent dispensers are illustrated and specfications given for them. The throw-away type is a cardboard container, bracket-mounted, with a plastic dispensing knob. The advantages of both types of dispenser are listed.

Changerooms 541
The Moore Co. The design and layout of industrial changerooms is the subject of this 20-page booklet. Suggested layouts, illustrations, specifications and engineering drawings are given. Details discussed are location, floors and walls, heating, ventilation, illumination, clothes storage, benches, traffic flow, toilets, showers, soaps, drinking fountains, lavatories and first aid.

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Liquid Antiseptic Soap 542
Apter Bros. & Co. A 2-color, 4-page folder, this illustrated bulletin, covers the make-up, uses and qualities of a liquid antiseptic soap. The antiseptic properties for use against dermatitis are emphasized. Emollient qualities are discussed and test results with the new germicide are charted.

Washroom Controls 543
Diamond Alkali Co. Why pH and titration control, is the question posed and answered by this 16-page booklet. It describes the control of washing operations by these methods and emphasizes the soap-savings and quality control through these tests. It also discusses the actions of alkalis and acids in water, lists specific alkali formulas for specific types of soil, tells how titration and pH tests are made and suggests values for both.

Antiseptic Hand Cream 544
Althea Laboratories, Inc. The use of an antiseptic hand cream to protect hands against bacteria formation and check dermatits is the subject of this 8-page, 2-color brochure. The softening and deodorizing qualities of the cream are also discussed, but major attention is devoted to the ingredient which kills bacteria and protects the skin against reinfection.

Hand Dryer 545
Dryer Co. of America, Inc. An electric hand drier for washrooms is discussed and explained in this 4-page, 2-color pamphlet. Among advantages listed are rapid drying, ozonating deodorizing, no maintenance and cost saving. Specifications are listed and adjustable nozzle for face-drying is illustrated.

FLOOR MAINTENANCE

Abrasive Floor Plate 546
Alan Wood Steel Co. Abrasive rolled steel floor plate and its applications are covered in this 2-color, 10-page booklet. Detailed explanation of the manufacture, specifications, fabrication and the flooring's applications to plants is accompanied by illustrations and diagrams on all phases of the discussion. The flooring is designed to be long-wearing and non-slip, even on steep inclines.

Concrete Hardener 547
L. Sonneborn Sons' Inc. This literature describes a chemical for hardening and dustproofing concrete floors and other terazzo and concrete surfaces. In step-by-step, question-and-answer form, the necessity for hardening and dustproofing, the details of the hardener, its use, how it operates and the results are explained. Diagrams and pictures complete the story. Comparison of various types of hardeners is undertaken and advantages of the chemical hardener emphasized.

Motor Sweeper 548
Motor-Mower Co. This 4-page, 2-color bulletin devotes itself to describing and illustrating an all-purpose, one-man, walking or riding, industrial sweeper. Central idea is action of dual brushes arranged in tandem, and sweeping in opposite directions. Vacuum dust control, wall brush, power steering and adaptability to all types and sizes of floors and sweeping purposes are also listed advantages.

Marble Stair Treads 549
Vermont Marble Co. This 1-page, illustrated bulletin covers safety abrasive waterproof cement strips for permanent application to marble stairs. The non-slip strips also bond permanently to slate, granite travertine, limestone, bluestone, concrete, terazzo and wood. The material can also be used as an all-over surface treatment for traffic areas in severe service.

PERSONAL PROTECTION

Eye Protection 550
Jackson Products. Welding helmets, goggles and eyeshields are discussed in this 4-page, 2-color brochure. Goggles for brazing, flame-cutting, welding, chipping and grinding are individually described and illustrated. Lightweight face-shields and arc welding helmet also are treated. Plastic construction materials are used in many cases.

Protective Clothing 551
Dunn Products. Illustrated and described in this 125-page catalog are different types of protective clothing including footwear, aprons, gloves and other body protection. Samples of various materials are also attached. Many

(Continued on the next page)

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varieties of gloves and aprons are covered. Uses range from fire and acid protection to water and dust protection. Hand protection against cutting is emphasized.

Safety Shoes 552
H. Childs & Co., Inc. Steel toe safety shoes in many styles are detailed and illustrated in this 2-color, 20-page brochure. Ranging from men's dress, women's dress, heavy duty, lace to toe, rubber footwear, cork soles, and safety boots through specialty styles such as moulders' and electricians' shoes, the brochure covers each shoe individually and includes specifications.

MATERIALS HANDLING EQUIPMENT

Sling Chains 553
American Chain & Cable Co. Beginning with 7 points to consider when selecting chains, this 32-page booklet discusses the advantages and limitations of alloy, carbon steel, stainless steel, iron, monel and bronze sling chains. It goes on to list the important points in inspecting and maintaining chains, describes loading procedures and charts safe-loadings for various sizes, composition, and different leg chains, as well as diagramming and explaining the use of foundry hooks, sling hooks, grab hooks, magnet chains, and sling chain adjustors.

Fork-Lift Trucks 554
Clark Equipment Co. This 16-page, multi-colored booklet describes electric, gas-electric, gasoline, diesel and l-p gas driven fork-lift trucks, in addition to various types of power transmissions, outdoor trucks, attachments, hand trucks and close-quarter trucks. Featured is a new experimental truck which is designed to test various new ideas and pave the way for the fork-truck of the future.

Barrel Handling 555
The Elwell-Parker Electric Co. This 8-page booklet discusses the handling of barrels and the application of various types of materials handling equipment to the problem. Selecting the correct type of container, assembling the containers into unit loads, transporting these loads and short-cuts to efficient handling are taken up in turn. Illustrations are plentiful.

MISCELLANEOUS

Lubricant 556
The Warren Refining & Chemical Co. A lubricant claimed to be the successor to grease because of its ability to withstand high temperatures without melting, water resistance, better adhesion, greater stability, better pumpability and economy, is the subject of this 2-color, literature. Charts compare the reactive clay-base lubricant with other lubricants in important characteristics.

Color Painting 557
Pittsburgh Plate Glass Co. This multi-colored, illustrated, 32-page booklet discusses the values of the application of color in industry for reduced eye fatigue, proper lighting, improved morale and greater production efficiency. Color painting for walls, machines, aisles and floors, and mobile equipment is covered and specifications for paints for various surfaces as well as a chart of approved safety colors are given.

Accident Prevention Signs 558
Stonehouse Signs, Inc. A 65-page, multi-colored catalog of accident prevention signs, this literature begins with a discussion of specifications for colors of various types of signs. It then goes on to cover signs warning against eye hazards, machine dangers, fire, and falling. First aid, sanitation, general accident prevention signs, no admittance, maintenance, traffic, safety slogan, efficiency, danger tags, men working, electrical dangers, caution and notice signs are illustrated and described.

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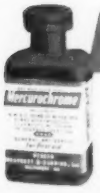
SORE THROATS due to coughs and colds, if neglected, may result in lost man hours of work.

The use of 'Thantis'® Lozenges puts first things first.

'Thantis' Lozenges relieve pain promptly—reduce infection—act prophylactically.

Twenty-three years' extensive clinical and lay use has proved the safety and effectiveness of this popular product.

® *Reg. U.S. Pat. Off.*



Mercurochrome *first aid for wounds*

Neglect may cause infection which can be prevented by prompt use of 'Mercurochrome'.®

No antiseptic has been proved to be more effective than 'Mercurochrome' for topical application.

H W D

HYNSON, WESTCOTT & DUNNING, INC., BALTIMORE 1, MARYLAND

(For further details, use Key # J-50 on free Inquiry Card on page 81)